

## **Historic, Archive Document**

Do not assume content reflects current scientific knowledge, policies, or practices.



79.854E  
copy 2

# BULLETIN

## GRADUATE SCHOOL

### UNITED STATES DEPARTMENT OF AGRICULTURE

FALL AND SPRING

1946-1947



GRADUATE AND UNDERGRADUATE STUDY  
FOR FEDERAL EMPLOYEES

COURSES AND REQUIREMENTS FOR THE SEMESTERS  
BEGINNING SEPTEMBER 23 AND FEBRUARY 3

WASHINGTON - AUGUST, 1946

*This Bulletin covers graduate and undergraduate programs for Fall and Spring Semesters. A special bulletin of courses on various aspects of personal development and worthwhile use of leisure will be available on request after September 1. A bulletin on correspondence study is likewise available.*

## Calendar for the 26th School Year, 1946-47

### Fall Semester

September 9 to 21—Registration  
September 23, Monday—Fall Semester begins  
September 23 to 27—All classes begin unless other date is given in Time Schedule Bulletin  
October 4—Last day of registration for credit  
October 4, Friday—End of refund period and last day of registration, or registration transfer without payment of extra fee  
November 1—Last day to make deferred payments  
November 11, Armistice Day—No classes  
November 28, Thanksgiving holiday—No classes  
December 21, Saturday—Christmas holidays begin; no classes  
January 6, Monday—Classes resume after holidays  
January 17, Friday—Close of Fall Semester \*

### Spring Semester

January 13 to 31—Registration  
February 3, Monday—Spring Semester begins  
February 3 to 7—All classes begin unless other date is given in Time Schedule Bulletin  
February 14—Last day of registration for credit  
February 14, Friday—End of refund period and last day of registration, or registration transfer without payment of extra fee  
March 14—Last day to make deferred payments  
May 16, Friday—Close of Spring Semester \*

### Summer Session

Classes Begin the Week of June 9

\* Classes which have missed sessions because of the restoration of holidays in the Federal service or for any other reason will continue until deficiency is made up.

Business Office—Room 1031, South Agriculture Building  
Between 12th and 14th on Independence Avenue, SW.  
Hours—9:00 A.M. to 6:20 P.M., Monday through Friday  
Telephone—Republic 4142, Extension 6337

# Graduate School

1946-47

26th Year



## Schedule of Classes

*Fall Semester*

**REGISTRATION—September 9 to 21**

**HOURS: 9:00 A.M. to 6:20 P.M.**

**Monday through Friday**

**SPECIAL HOURS: OPEN 9:00 A.M. to 1:00 P.M.**

**Saturday September 14 and 21**

**CLASSES BEGIN WEEK OF SEPTEMBER 23**

# Time Schedule and Supplement to 1946-47 Bulletin

---

**Complete details**, including rules and regulations, policies, and course descriptions, are given in the **1946-47 Bulletin**, a copy of which may be obtained by writing (use form on bottom of page) or by calling in person. **Please do not telephone.**

**Counseling** on courses and programs of study is available at all times from members of the School staff who are glad to assist students in planning their work.

**Registration:** September 9 to 21 (Room 1031, South Building, Department of Agriculture). See schedule of hours on front cover. No one will be registered for credit after October 4, except with special permission of instructor and Registrar. A late registration fee of \$1.00 per course will also be charged after October 4. Registration closes in a course when the maximum for that class is reached.

**Textbooks** may be purchased in Room 1041, South Agriculture Building, from 4:30 to 6:20 p.m., September 16 through October 11 (Saturdays excluded).

**Refund** of fees, less \$3.00 registration fee, may be granted in case of withdrawal before 6:20 p.m., October 4. After this date no refunds will be approved unless the student is compelled to leave Washington because of official governmental action.

**Room schedules** will be posted on the 4th and 7th wing bulletin boards in the South Agriculture Building.

**Classes begin** during week of September 23.

**Graduate School, Department of Agriculture  
Washington 25, D.C.**

**Please send me your 1946-47 BULLETIN.**

**Name** . . . . .

**Street** . . . . .

**City** . . . . . **Zone** **No.** . . . . .

**Explanation:** Basic information about each course is given in the following order: course number, title, instructor, day and hour of class meeting, and fee. Complete course descriptions may be found in the 1946-47 BULLETIN under the departments as here listed.

## BIOLOGICAL SCIENCES

- 700. **Progress in the field of Antibiotics<sup>1</sup>** (Irving, Herrick and Specialists) Tu 7-9 \$18
- 603. **Advances in Plant Breeding<sup>1</sup>** (Stevenson and Specialists) Tu 6-8 \$18
- 605. **Advances in Insecticides and Fungicides** (Golds-worthy, Bishopp and Specialists) W 6-8 \$18
- 608. **Recent Advances in Animal and Human Nutrition** (Bird, Callison, Earle, Moore and Specialists) Tu 6-8 \$18
- 209. **Systematic Botany** (Blake) M 6-8 \$16
- 512. **Medical and Veterinary Entomology** (Bishopp) M 6-8 \$18
- 310. **Background and Development of Biological Sciences** (Ewan) Tu 6-8 \$16

## LANGUAGES AND LITERATURE

- 222<sup>a</sup>. **Composition and Rhetoric** (Miller) Tu 6-9 \$24
- 223. **Descriptive English Grammar** (Ward) M 6-8 \$16
- 51. **English for Foreign Students** (Williams) M 6-8 \$16
- 224. **Creative Writing** (Holt) Tu 6-8 \$16
- 225. **Editing** (Merrill and Specialists) M-W 6-7:30 \$24
- 226<sup>a</sup>. **Writing for Official Purposes** (McClaren) Th 6:30-8:30 \$16
- 237. **Government Printing Procedure** (Anderson) F 7-8 \$8
- 228. **Fundamentals of Speech** (Provensen) W 6-8 \$16
- 232. **Voice and Remedial Speech** (Emery) Tu 6-8 \$16 and \$1 laboratory fee
- 350. **Effective Meetings** (Ensminger, Boatman) M 6:30-8:30 \$16
- 43. **Personal Development** (Provensen) Tu 6-8 \$16
- 327. **Current Books** (Roberts) Th 6-7 \$8
- 233<sup>a</sup>. **Elementary Arabic** (Egleston) F 6-8 \$16
- 238<sup>a</sup>. **Elementary Chinese** (Tsiang) Tu-Th 6-8 \$32
- 253<sup>a</sup>. **Elementary French** (Humphrey) M-Th 6-7:30 \$24
- 254<sup>a</sup>. **Intermediate French** (Humphrey) Tu-Fri 6-7:30 \$24
- 255<sup>a</sup>. **Conversational French** (Longi) W 6-9 \$24
- 259<sup>a</sup>. **Elementary German** (Lederer) Th 6-9 \$24
- 260<sup>a</sup>. **Intermediate German** (Ponti) Th 6-9 \$24
- 261<sup>a</sup>. **Conversational German** (Bauer) M 6-9 \$24
- 270<sup>a</sup>. **Elementary Italian** (Rossetti) W 6-9 \$24
- 271<sup>a</sup>. **Intermediate Italian** (Rossetti) Th 6-9 \$24
- 275<sup>a</sup>. **Elementary Japanese** (Yoshioka) Tu-Th 6-7:30 \$24
- 290<sup>a</sup>. **Elementary Portuguese** (D'Eca) Tu-Th 6-7:30 \$24
- 295<sup>a</sup>. **Elementary Russian** \$24  
Section I (Schuler) M 6-9  
Section II (Tarakus) W 6-9
- 295<sup>b</sup>. **Elementary Russian** (Saharov) M 6-9 \$24
- 296<sup>a</sup>. **Intermediate Russian** (Von Bretzel) Tu 6-9 \$24
- 299<sup>a</sup>. **Advanced Russian** (Saharov) W 6-9 \$24
- 300<sup>a</sup>. **Elementary Spanish** \$24  
Section I (Batista) W 6-9  
Section II (Johnston) Th 6-9
- 300<sup>b</sup>. **Elementary Spanish** (Parsons) W 6-9 \$24
- 301<sup>a</sup>. **Intermediate Spanish** (Brown) M 6-9 \$24
- 302<sup>a</sup>. **Spanish Conversation and Literature** (Mr. Supervia) Th 6-8 \$16

<sup>1</sup> Given at the Agricultural Research Center, Beltsville.

574<sup>a</sup>. Advanced Spanish Conversation (Mrs. Supervia)  
Th 6-8 \$18  
304. Commercial Spanish (Lever) W 6-9 \$24

## MATHEMATICS AND STATISTICS

### MATHEMATICS

1. Review of Freshman Mathematics (Schell) Th 6-9 \$24
102. Algebra (Graves) M 6:30-8:30 \$16
206. Calculus (Finan) W-F 6-7:30 \$24
700. Vector Analysis (Wundheiler) W 6-8 \$18
709. Theory of Infinite Processes (Winston) Th 6:30-8:30 \$18
715. Applications in Engineering Mathematics (Cook) Th 6:30-8:30 \$18
716. Introduction to Higher Geometry (Goldberg) Tu 6-8 \$18
751. Theory of Measure (Daly) M 7-9 \$18

### STATISTICS

123. Survey of Statistics (Simmons) Tu 6:30-9:30 \$24
110. Graphic Methods of Presenting Statistics (Hainsworth, Guidry) M 6-8 \$16
126. Introductory Statistics (Purves) W 6:15-8:15 \$16
- 127<sup>a</sup>. Elementary Statistical Analysis—First Half (Weiss) Th 6-8 \$16
- 127<sup>b</sup>. Elementary Statistical Analysis—Second Half (Steinberg) M 6-8 \$16
516. Intermediate Statistics (Tepping) Tu 6-8 \$18
318. Machine Tabulation (Kaufman) W 6:30-8:30 \$12
319. Advanced Study of Tabulating Equipment (Kaufman) F 6:30-8:30 \$12
520. Statistics of the Federal Government (Ullman) W 6:30-8:30 \$18
723. Design and Analysis of Complex Experiments (Brandt, Pope) M-W 6-7 \$18
726. Interpretation of Statistical Calculations (Sturges) M 6-8 \$18
732. Sampling in Social and Economic Surveys (Nisselson) Tu 6-9 \$27
735. Theory of Sample Surveys (Hansen, Hurwitz) W 7:30-9:30 \$18
738. Introduction to Sampling and Statistical Inference<sup>1</sup> (Deming) Th 7-9 \$18
739. Multivariate Analysis (Girshick) Tu 6:30-9:30 \$27
753. Modern Developments in Statistical Economics (Girshick)<sup>2</sup> Th 8-10 a.m. \$18

## OFFICE TECHNIQUES AND OPERATIONS

108. Administrative Procedure (Hickey) W 6-8 \$16
208. Advanced Administrative Procedure (Thorson) Th 6-8 \$16
116. Federal Budgetary Procedure (Hanna) M 6:30-8:30 \$16
122. Federal Payroll Procedure (Krueger, Marshall) Th 6-8 \$16
112. Federal Accounting Procedure (Tierney) Th 6-9 \$18
110. Federal Auditing Procedure (Cruikshank) M 6-8 \$16
- 210<sup>a</sup>. Advanced Federal Auditing Procedure—First Half (Cooper) Tu 6:30-8:30 \$16
413. Office Management (Braum) M 6-8 \$16
114. Federal Personnel Procedure (Mohagen) M 6-8 \$16
214. Advanced Federal Personnel Procedure (Mohagen) Tu 6-8 \$16

<sup>1</sup> Given at 1712 G Street, N.W., Room 506.

<sup>2</sup> Given at 1712 G Street, N.W., Room 515.

115. **Federal Purchasing Procedure** (Scammahorn) Tu 6-8 \$16  
 117. **Records Management Procedure** (Donaldson, Smith and Lecturers) Tu 6-8 \$16  
 118. **Practical English Usage** (White) Th 6-8 \$16  
 119. **Vocabulary Building** (Bryan) M 6-8 \$16  
 120. **Government Letter Writing** (Samson) F 6-8 \$16  
 341. **Systematic Coordination of Management Directives** (Yocum) Th 6-8 \$16  
 325. **Secretarial Practices** (Stephens) Th 6-8 \$16  
 89. **Review of Gregg Shorthand** (Evans) Tu-F 6-7:30 \$24  
 129. **Beginning Gregg** (Bolton) M-Tu-Th 6:30-7:30 \$24  
 130. **Intermediate Gregg** (Richter) M-Th 6-7:30 \$24  
 230. **Gregg, 70 to 100 Words** (Coffman) Tu 6-8 \$16  
 231. **Gregg, 100 to 130 Words** (Toll) W 6-8 \$16  
 335. **Reporting—Gregg, 140 to 200 Words** (Foote) M-Th 6:30-8:30 \$32  
 338. **Shorthand in Spanish** (Krissillas) Th 6-8 \$16

## PHYSICAL SCIENCES

147. **General (Inorganic) Chemistry** (Carter) F 6-8 \$16  
 248. **Organic Chemistry** (Bowen) Th 6-8 \$16  
 349. **Physical Chemistry** (Hamer) Tu 6-8 \$16  
 522. **Physiological Chemistry** (Johnston) W 6-8 \$18  
 532. **Geochemistry** (Chambliss) W 6-8 \$18  
 762. **Electrochemistry** (Hamer) Th 6-8 \$18  
 455. **Geomorphology of the US** (Meyerhoff) Th 6-9 \$24  
 156. **Soil Conservation** (Steele) Th 6-8 \$16  
 157. **Soil Fertility** (Ableiter) Tu 6-9 \$24  
 452. **Principles of Physical Metallurgy** (Loring) W 6-8 \$16  
 527. **Experimental Techniques in Physical Metallurgy<sup>1</sup>** (Loring) Th (hours to be arranged) \$18  
 162. **Principles of Meteorology** (Johnson) Tu 6-9 \$24  
 533. **Hydrology<sup>2</sup>** (Linsley) Th 6-9 \$27  
 536. **Physical and Synoptic Meteorology** (Shands) W 6-9 \$27  
 153. **Introductory College Physics<sup>3</sup>** (Kilgore) M-Th 6:30-9:00 \$32 and \$3 laboratory fee  
 700. **Advanced Optics<sup>1</sup>** (Kiess) M-W 5:10-6:30 Special fee of \$20 for the year

## PUBLIC ADMINISTRATION

699. **Lecture Series: What We Learned in Public Administration During the War** (Thurston) Tu (time to be announced) \$9 for credit students; \$3 general lecture admission for the series  
 344. **Introduction to Public Administration** (Russell) Th 6-9 \$24  
 626. **Federal Administrative Management** (Becknell) W 6-8 \$18  
 627. **Reporting to Top Management** (Burton) Tu 6-8 \$18  
 710. **Seminar in Public Relationships in Government Administration** (Webster and Specialists) Th 6-8 \$18  
 624. **Organizational and Procedural Analysis** (Stone, Loftus) F 6:15-8:15 \$18  
 519. **Work Measurement and Performance Standards** (McKillop and Shaw) Tu 6-8 \$18  
 525. **Financial Organization and Procedures of the Federal Government** (Tiller) Tu 6-8 \$18  
 635. **Agency Budgetary and Financial Administration: Budget Formulation** (Manvel, Jump) Th 6-8 \$18

<sup>1</sup> Given at the Naval Research Laboratory.

<sup>2</sup> Given at the Bureau of Standards.

<sup>3</sup> Given at Wilson Teachers College.

561. **Public Personnel Administration** (Stahl) Tu 6-8 \$18

627. **Tests and Measurements** (Richardson) Tu 6-8 \$18

530. **Selection and Placement** (McLean) Th 6:30-8:30 \$18

640. **Veterans Legislation and Administration** (Petrie and Specialists) Tu 6-8 \$18

559. **Position Classification** (Hill and Laxton) M 6-8 \$18

643. **Advanced Position Classification** (Buckley) M 6-8 \$18

844. **Counseling Interview Workshop** (Barron) W 6-8 \$18

433. **Accident Prevention in the Federal Government** (Wetzel and Specialists) Tu 6-8 \$16

633. **Employee Relations and Employee Services** (Kraus) F 6:30-8:30 \$18

658. **Law of Federal Personnel Administration** (Koebel, Tremain) Th 6-8 \$18

842. **Personnel Division Management** (Couch) M 6-8 \$18

717. **Administrative Law and Procedure** (Flavin) W 6-8 \$18

637. **Management of Governmental Purchasing** (Scam-mahorn) Th 6-8 \$18

-352<sup>a</sup>. **Principles of Accounting**—First Half \$24  
Section I (Rowe) M 6-9 W 6-7  
Section II (Brownold) Tu 6-7 Th 6-9

352<sup>b</sup>. **Principles of Accounting**—Second Half (Dye) Tu 6-9 Th 6-7 \$24

353<sup>a</sup>. **Intermediate Accounting** (Hord) M 6-9 \$24

422. **Business Law** (Mostow) Tu 6-8 \$16

354. **Federal Government Accounting** (Mason) W 6-9 \$24

642. **Cost Accounting** (D'Allesandro) W 6-9 \$27

645. **Federal Tax Accounting** (Moyer) M 6-9 \$27

646. **Advanced Accounting Problems** (Acker) W 6-9 \$27

## SOCIAL SCIENCES

200. **Introduction to Economics, Theory and Institution** (Allin) Th 6-8 \$16

201. **Principles of Economics** (Thomsen) Tu 6-9 \$24

705. **History of Economic Thought** (Wasserman) W 7-10 \$27

709. **Structure of American Business** (Magdoff) F 6-8 \$18

711. **Imperfect Competition and Public Regulation** (Means) W 6-9 \$27

401. **Monetary and Employment Theories** (Hagen) Tu 6-8 \$16

704. **Economic Theory of International Trade** (Wad-leigh) M 6-8 \$18

300. **Marketing from Consumer's Point of View** (South-worth) Th 6-8 \$16

325. **Managing Personal Finances** (Larsen and Specialists) Th 6-8 \$16

422. **The Economics of Clothing and Textiles** (Brew) Th 6:30-8:30 \$16

403. **Labor and Social Legislation Abroad<sup>1</sup>** (Williams and Specialists) M 6-8 \$16

203. **Economics of Marketing** (White) Th 6-9 \$24

405. **Marketing Consumer Goods** (Albright) F 6-8 \$16

204. **Current Policy Problems of American Agriculture** (Reid and Lecturers) M 6-7 \$8

407. **History of Agricultural Policy in U. S. since the Colonial Period** (Edwards) Tu 6-8 \$16

423. **Rural Social Policies in the U. S. and other Countries<sup>2</sup>** (Cohen) Th 6-8 \$16

408. **Economics of Contemporary Policies** (Maddox) M 6-8 \$16

<sup>1</sup> Given at the Department of Labor.

<sup>2</sup> Given at the New Social Security Building.

716. **Seminar in Economic and Social Implications of Current Agricultural Policies** (Minor and Shields) M 7-9 \$18

719. **Seminar in Policy Problems in Resource Utilization, Development and Conservation** (Kotok, Johnson, Nichols) Tu 6-8 \$18

206. **Federal Crop Insurance** (Rowe, Colby) Th 6-7 \$8

207. **Economics of Farm Production** (Finner) M 6-9 \$24

409. **Farm Management** (Goodsell and Specialists) Tu 6-8 \$16

411. **Agricultural Finance** (Horton) W 6-9 \$24

416. **Agricultural Cooperation** (Davis, Hedges, Miller) Tu 6-9 \$24

427. **International Political Psychology** (Leites) M 6-9 \$24

724. **Problems and Machinery of World Organization** (Spitzer) W 6-8 \$18

727. **Seminar in Problems of National Defense and of the Prevention of War** (Possony) W 6-8 \$18

528. **International Financial and Trade Policies** (Zaglitz) Th 6-8 \$18

814. **World Agriculture** (Hainsworth, Purves, Whipple) Tu-Th 6-8 \$36

816. **World Communication and Transport** (Van Royen) Th 6-8 \$18

430. **Contemporary Russia** (Tereshtenko) Th 7-9 \$16

400. **Psychology of Human Relations** (Coffey) Th 6-8 \$16

501. **Social Psychology** (Schuler, Taylor) W 6-8 \$18

503. **The Conditions of Personality Growth** (Chapman) W 7-9 \$18

504. **Personality Disorders** (Chapman) M 7-9 \$18

739. **Psychological Foundations of Economics** (Katona) Th 6-8 \$18

215. **General Sociology** (Raper) Th 6-9 \$24

507. **Farm Labor and Tenure Problems** (Ducoff, Timmons) Tu 6-8 \$18

509. **La America Latina y los Estados Unidos** (Green) M 6-8 \$18

510. **Population** (Taueber, Hauser and Taueber) W 6-9 \$27

515. **Rural Organization and Group Action** (Ensminger) Tu 6-9 \$27

516. **The Cultural Regions of the United States** (Taylor, Raper) M 6-9 \$27

338. **Regulation of Communication<sup>1</sup>** (Emery) Th 6-8 \$16

605. **Communications in Society** (Smythe) Tu 6:30-8:30 \$18

337. **Principles of Transportation** (Snell) W 6-9 \$24

601. **Traffic Management** (Perrin) Th 6-9 \$27

651. **Commercial Air Transportation** (Robinson) Tu 6-9 \$27

## TECHNOLOGY

475. **Naval Architecture** (Wright) Tu 6-8 \$16

476. **Ship Construction** (Wright) Th 6-8 \$16

401. **Pumping for Drainage and Irrigation** (Sutton) M 6-8 \$16

402. **Principles of Refrigeration** (Garver) Th 6-8 \$16

501. **Transmission and Distribution Systems for Area Electrification** (Eardley) Th 6-9 \$27

700<sup>a</sup>. **Analysis of Rigid Frames<sup>2</sup>** (Amirikian) Tu-Th 7-9 \$27

702. **Electric Utility Engineering<sup>3</sup>** (Jessel, Lynott) Tu 6-8 \$18

703. **Water Power Engineering** (Ross and Specialists) Tu-Th 6-8 \$27

<sup>1</sup> Given at the Federal Communications Commission Building.

<sup>2</sup> Given at the Bureau of Ships.

<sup>3</sup> Given at the Federal Power Commission.

704. **Fundamentals of Gas Turbines and Jet Propulsion** (Shreeve) W 6-8 \$18

706. **Advanced Hydraulics** (Patterson) W 6:30-9:30 \$27

536. **Ground-Water Hydraulics** (Jacob) M 6-9 \$27

310. **Aerodynamics** (Koneczny) F 6-8 \$16

301. **Soil Mechanics** (Barber) F 6-9 \$24

540. **Theory of Elasticity** (Osgood) M-Th 7-8 \$18

542. **Mechanical Vibrations** (Levy) Tu 6-8 \$18

715. **Engineering Administration of Government Contracts<sup>1</sup>** (Helfrich) Tu-Th 6-7:30 \$27

550. **Contracts and Specifications<sup>1</sup>** (Smith and Specialists) W 6-9 \$27

554. **Patent Law for Executive and Scientific Personnel** (Kramer) Th 6-8 \$18

210<sup>a</sup>. **Elementary Surveying** (Whitaker) M-W 6-8 \$28

211<sup>a</sup>. **Advanced Surveying<sup>2</sup>** (Rappleye) M 6-8 (field work all day Saturday, every fourth Saturday) \$28

212<sup>a</sup>. **Elementary Aerial Photogrammetry<sup>3</sup>** (Higginson) Tu-Th 7-9 \$28

213<sup>a</sup>. **Advanced Aerial Photogrammetry<sup>2</sup>** (Tewinkel) W 6-9 F 6-8 \$28

214<sup>a</sup>. **Cartography** (Everett) Tu 6-8 \$16

321. **Pencil Sketching and Freehand Drawing** (Cadmus) M-W 6-8 \$24

322. **Art Appreciation<sup>4</sup>** (Rowan) Tu 6-8 \$16

323. **Drawing for Portraiture and Illustration<sup>4</sup>** (Lazzari) M-W 6-8 \$24

320. **Water Color Painting<sup>5</sup>** (Lyons) M-W 6-8 \$24

331<sup>a</sup>. **Home Decoration** (Garrels) W 6-7 \$8

332. **Advanced Home Decoration** (Garrels) W 7-8 \$8

327. **Domestic Architecture<sup>4</sup>** (Powers) F 6-8 \$16

505. **Functional House Planning<sup>6</sup>** (Sater, Dodge) Th 6-9 \$18

315. **Theory of Modern Architecture<sup>4</sup>** (Yerkes and Specialists) M 6-8 \$16

316. **Landscape Development of the Small Property<sup>4</sup>** (Hagemann) W 6-8 \$16

324<sup>a</sup>. **Basic Mechanical Drawing<sup>4</sup>** (Wiemer) Tu-F 6-8 \$24

325<sup>a</sup>. **Architectural Drafting<sup>4</sup>** (Wiemer) Tu-F 6-8 \$24

325<sup>b</sup>. **Architectural Drafting<sup>4</sup>** (Wiemer) M-Th 6-8 \$24

326. **Engineering and Machine Drafting<sup>4</sup>** (Conway) M-Th 6-8 \$24

28. **Blue-print Reading<sup>4</sup>** (Conway) W 6-9 \$16

188. **Glass Blowing<sup>7</sup>** (Clark) M-W 6-7:30 \$24

192. **Basic Photography** (Hanson) M 6-8 \$16

197. **Chemistry of Photography** (Faust) W 6-8 \$16

193. **Applied Photography** \$16 and \$2 laboratory fee  
Section I (Purdy) M 6-8  
Section II (Purdy) W 6-8

507. **Theory of Color Photography** (Lefebvre and Special Lecturers) Tu 7-9 \$18

196. **Applied Color Photography** (Purdy) Th 6-9 \$24 and \$5 laboratory fee

150. **Fibers of Industrial Importance** (Berkeley, Hardy and Specialists) Tu 6-8 \$16

350. **Textile Testing<sup>8</sup>** (Schiefer) Tu 7-9 \$16

450. **Survey of Recent Technical Developments in Textiles** (Appel and Specialists) Tu 6-8 \$16

707. **Ethics for Engineers<sup>4</sup>** (Sette) W 7-8 \$9

708. **History of Engineering<sup>4</sup>** (Sette) M 6-8 W 6-7 \$27

<sup>1</sup> Given at the Treasury Procurement Building.

<sup>2</sup> Given at the Department of Commerce.

<sup>3</sup> Given at the Department of Commerce or Clarendon, Va., Old Dominion Bank Building.

<sup>4</sup> Given at Tempo 2, 19th and D Streets, N.W.

<sup>5</sup> Given at Wilson Teachers College.

<sup>6</sup> Given at the Agricultural Research Center, Beltsville.

<sup>7</sup> Given at the Smithsonian Institution.

<sup>8</sup> Given at the Bureau of Standards.

# BULLETIN

---

GRADUATE SCHOOL  
UNITED STATES DEPARTMENT OF AGRICULTURE

FALL AND SPRING

1946 – 1947



*Please preserve this catalog for use in  
the Spring Semester also. New copies  
will not be available in the Spring.*

WASHINGTON ~ AUGUST, 1946

# Contents

	PAGE
<b>General Information</b>	
History and Objectives	5
Counseling Services	8
Library Facilities	8
Correspondence Work	9
Lectures and Publications	9
General Graduate Degree Requirements	10
Certified Statements of Accomplishment	11
<b>Regulations and Procedures</b>	
Admission	12
Veterans	12
Registration Regulations	13
Fees	13
Withdrawal	14
Classification of Courses	14
Attendance Regulations	15
Credit and Grades	15
Room Schedule	15
<b>Departments of Instruction</b>	
Biological Sciences	17
Languages and Literature	21
Mathematics and Statistics	29
Office Techniques and Operations	42
Physical Sciences	51
Public Administration	59
Social Sciences	80
Technology	106
<b>Faculty</b>	124
<b>Index</b>	141

# Administration

## GENERAL ADMINISTRATION BOARD

T. ROY REID, M.S., D.Agr., Director of Personnel, Chairman

PHILIP V. CARDON, M.S., Research Administrator, Agricultural Research Administration

NORRIS E. DODD, Under Secretary of Agriculture

C. O. HENDERSON, M.S., Chief, Division of Training, Office of Personnel

ROBERT W. HUGDENS, B.S., Associate Administrator, Farm Security Administration

JAMES T. JARDINE, D.Sc., Chief, Office of Experiment Stations

WILLIAM A. JUMP, Director of Finance and Budget Officer

ROBERT H. SHIELDS, LL.B., Administrator, Production and Marketing Administration

LYLE F. WATTS, M.F., Chief, Forest Service

## OFFICERS

LEWIS H. ROHRBAUGH, Ph.D., Director

HAROLD F. EISELE, Ph.D., Assistant Director

ALBERT F. WOODS, D.Sc., LL.D., Educational Adviser

BARBARA P. BURROW, M.A., Registrar

JOHN M. HAMILTON, B.A., Staff Assistant

DWIGHT L. MYERS, Treasurer

RUTH O. CARLOCK, A.B., Office Manager

MILDRED V. MORRIS, Office Assistant

VIRGINIA MONTILLO, Office Assistant

MARY E. TICE, Office Assistant

## CHAIRMEN OF DEPARTMENTAL COMMITTEES

HOWARD P. BARSS, M.S. .... Department of Biological Sciences

HARRY B. HUMPHREY, Ph.D. .... Department of Languages and Literature

W. EDWARDS DEMING, Ph.D. .... Department of Mathematics and Statistics

STROTHER B. HERRELL .... Department of Office Techniques and Operations

HENRY STEVENS, Ph.D. .... Department of Physical Sciences

WILLIAM G. FINN, M.S. .... Department of Public Administration

FREDERICK V. WAUGH, Ph.D. .... Department of Social Sciences

FRANCIS J. SETTE, M.S. .... Department of Technology

## COMMITTEE ON INTERNAL AUDIT

JOHN C. COOPER, A.B., (Chairman) Chief, Audit Division, Office of Budget and Finance, USDA \*

HUBERT CAVELAGE, C.P.A., District Bank Coordinator, Farm Credit Administration, USDA

CARL A. FRETTS, B.S., Chief Fiscal Officer, Federal Crop Insurance Corporation, Production and Marketing Administration, USDA

JOHN F. MCSHEA, C.P.A., Assistant Chief Auditor, Production and Marketing Administration, USDA

ARCH F. ROUNSAVILLE, A.B., Chief, General Audit Division, Production and Marketing Administration, USDA

\* United States Department of Agriculture.

## COMMITTEE ON FACILITIES

EVERETT C. NORBERG, LL.B., (Chairman) Assistant Chief, Office of Plant and Operations, USDA  
CARL E. HERRICK, A.B., Chief, Division of Personnel Relations and Safety, Office of Personnel, USDA

FRED HUGHES, Chief, Administrative Services Division, Budget and Management Branch, Production and Marketing Administration, USDA

C. E. SCHOENHALS, Assistant to Research Administrator, Agricultural Research Administration, USDA

R. L. SWENSON, B.S., Manager, Agriculture Group, Public Buildings Administration, Federal Works Agency

## COMMITTEE ON INFORMATION

WILLIAM S. HARRIS, M.S., (Chairman) Administrative Officer, Office of the Secretary, USDA  
SIDNEY J. ADAMS, LL.B., Administrative Officer, Bureau of Agricultural and Industrial Chemistry, USDA

CHARLES H. CUNNINGHAM, M.A., Chief, Community Activities Branch, Office of Secretary of War, War Department

MILTON HALL, Ph.D., Chief of Training, Social Security Board, Federal Security Agency

LESLIE L. KULLENBERG, Assistant Director of Personnel Training, Commerce Department

DAVID T. STANLEY, B.A., Chief, Training Division, Office of Personnel, Veterans Administration

JOHN B. WHITELAW, Ph.D., Assistant Chief, In Charge of Departmental Training and Foreign Service Training, State Department

## COMMITTEE ON PREREQUISITES (1946-47 SCHOOL YEAR)

FREDERICK L. THOMSEN, Ph.D., (Chairman) Head, Division of Marketing and Transportation Branch, Bureau of Agricultural Economics, USDA

A. E. BRANDT, Ph.D., Research Specialist, Experimental Design and Analyses Division, Soil Conservation Research, Soil Conservation Service, USDA

HAROLD CLARK, Ph.D., Chief, Training Section, Division of Personnel Management, Field Service Branch, Production and Marketing Administration, USDA

EDWARD H. GRAHAM, Ph.D., Chief, Biology Division, Soil Conservation Service, USDA

BLAKE M. LORING, Sc.D., Senior Metallurgist, U. S. Naval Research Laboratory, Navy Department

JOHN THURSTON, Ph.D., Administrative Council, Office of the Secretary, USDA

## General Information

### HISTORY AND OBJECTIVES

The Graduate School was established by Secretary Henry C. Wallace in 1921 to stimulate and encourage post-entry education and to afford opportunities for the education and training of employees of the Department of Agriculture. It is a self-supporting, non-profit institution. Courses are open, however, to all qualified Federal employees and to other persons in-so-far as facilities permit. In fulfilling the purpose for which it was established (a center of learning after official working hours), the School now offers a wide variety of courses. Last year more than 5000 individuals, representing every agency of the Federal Government, were enrolled in these courses.

In its 25 years experience in meeting the changing educational needs of Federal employees, the School has become a unique educational institution combining, in effect, a graduate school, an in-service training institute, and an adult education organization. These three functions are implicit in the major objectives of the School:

1. "To supplement in-service training programs, conducted on government time and at government expense, by making it possible for employees to train themselves both intensively and extensively for proficiency in their present positions and for advancement to better positions.
2. To make available to career employees the opportunity to advance educationally, continuously and progressively, as they advance in job proficiency and responsibility.
3. To provide graduate education acceptable in graduate institutions for the convenience of employees who desire advanced degrees but find it difficult, both for personal and official reasons, to complete all study in residence at the degree-granting institution.
4. To provide certain cultural, creative, and leisure-time opportunities for employees.
5. To assure the attainment of these objectives by making available to employees the experience, knowledge, and instructional talent of outstanding specialists in the Federal service."<sup>1</sup>

The entire program of the School is based on the belief that work and study can be combined to the advantage of both, work giving meaning and motive to the learning process, and study supplying understanding and competence to the work situation. The

<sup>1</sup> United States Department of Agriculture "Regulations Governing the Graduate School Promulgated Pursuant to the Authority Contained in the Act of April 12, 1892 (20 U.S.C. Sec. 91), and the Deficiency Act of March 3, 1901."

School also operates in the conviction that after-work activities and off-the-job environment have a vital relation to morale and performance on the job. The public interest is served by providing Federal employees with broad opportunities for continuation study along the lines of their *general* interests as *individuals* as well as their *special* interests as *employees*. Courses, as a result, range from the cultural to the vocational, without exclusive emphasis on either.

#### AUTHORITY

Congress has authorized the use of Government facilities for study and research by qualified individuals, students, and graduates of institutions of learning in the several states and in the District of Columbia under rules and regulations set up by the heads of departments and bureau chiefs. It was under this authority, combined with the provisions of the organic act of the Department, that the Graduate School was organized. It is governed by Departmental regulations made pursuant to these Acts.

#### ADMINISTRATION

The government of the School is vested in a General Administration Board, appointed by the Secretary of Agriculture. The School is administered by a Director, appointed by the Board, and a small administrative staff. Eight committees named by the Board, one for each major division of the School, and special subcommittees, advise the administration concerning educational matters in their respective fields. Neither Board members nor committees receive compensation. The School receives no Federal funds. Its operating expenses are paid entirely from small course fees.

#### ROLE IN THE DEPARTMENT

Enhancement of morale and competence among employees of the Department of Agriculture and other Federal agencies is the chief justification for the Graduate School. The School contributes substantially to forward-looking personnel administration by supplying opportunities to escape blind-alley positions, to prepare for promotions, to find creative after-hours outlets, to escape from office routines, to cultivate genuine interests, to gain self-improvement, to find intellectual challenges equal to one's capacity, to keep abreast of an entire field or series of fields of knowledge when the daily job may require knowledge of only one small segment of a

single field, and to understand and appreciate relationships between one's own special task and the tasks of others. The relation of this program to Departmental management is recognized by Secretarial Memorandum, which names the Director of Personnel as Chairman of the General Administration Board of the School.

The School supplements Departmental in-service training programs, elaborates upon them and gives the employee an opportunity for more extensive general education. Training conducted on Government time is likely to be confined to immediate needs, to knowledge and skills which will give reasonably definite direct returns to the Government. The School supplies many opportunities which cannot be made available at Government expense and on Government time. While in-service training programs give primary, if not exclusive, attention to training needs as seen by management, the Graduate School can and does respond to the needs and desires of the employees, many of whom seek to prepare themselves for promotional opportunities entirely beyond their present positions. By close cooperation between official in-service training provided by the administrations, bureaus, and offices, and semi-official after-hours training provided by the Graduate School, the training and educational program of the Department of Agriculture, as a whole, is made more comprehensive, flexible, and responsive to the needs both of employees and of management.

## FACULTY

The tradition of a strong faculty in the Graduate School dates from its first year. The following men comprised the initial staff of ten:

### *Natural Sciences*

- \*Dr. C. O. Appleman, now Dean of the Graduate School, University of Maryland.
- \*Dr. Burton E. Livingston, now Professor Emeritus of Plant Physiology, Johns Hopkins University.
- \*Dr. C. L. Shear, now retired; formerly Principal Pathologist in charge of Mycology and Disease Survey, USDA.
- \*Dr. Richard C. Tolman, now Dean of the Graduate School and Professor of Physical Chemistry and Mathematical Physics, California Institute of Technology.
- \*Dr. Edgar T. Wherry, now Professor of Botany, University of Pennsylvania.
- \*Dr. Sewall Wright, now Burton Distinguished Service Professor of Zoology, University of Chicago.

\* Starred in *American Men of Science* for distinction in his special field.

*Social Sciences*

Dr. Alexander E. Cance, now Professor Emeritus of Economics, Massachusetts State College.

Dr. Henry C. Taylor, now Director of the Farm Foundation; formerly Chief, Bureau of Agricultural Economics, USDA. Mr. Howard R. Tolley, now Deputy Administrator and Chief Economist, Food and Agriculture Organization; formerly Chief, Bureau of Agricultural Economics, USDA.

Dr. Oscar C. Stine, now Head, Division of Statistical and Historical Research, Bureau of Agricultural Economics, USDA.

The School has always emphasized the human, non-physical element—teachers and students—in the educational process. The faculty is drawn almost entirely from the Federal service, a source of talent and expertness unexcelled anywhere in the nation. Professional competence is the sole criterion of selection. Faculty members combine excellent academic training, college teaching experience, and daily practice in the application of the subject matter taught. (See Faculty section on page 124.)

**COUNSELING SERVICES**

Careful planning is important for any prospective student, but particularly so for the Federal employee who wishes to make a substantial beginning in his educational program through the Graduate School, where degrees are not granted and credits must eventually be transferred to a degree-conferring institution.

The most vital single factor in studying for a degree is the setting up of a program which includes a group of logically related courses in a special field of scientific or professional study. Unless his courses are reasonably related to form an organic field of study, he may be disappointed in the amount of credit which will be granted him when he transfers to another school.

Officers of the Graduate School are available, from 9-5 each day except Saturday, for counseling on educational plans, whether to be pursued in the Graduate School or in other institutions. Educational counselors, representing the major fields of study and work, have been designated to advise students. A list of these may be obtained from the Graduate School. The counselors may be consulted by students from outside the Department of Agriculture.

**LIBRARY FACILITIES**

The Department of Agriculture Library, containing over half million books, is the Graduate School library. It is open to students from 8:30 A.M. to 8:30 P.M., Monday through Friday, and

9 A.M. to 1 P.M. on Saturday. A special collection of books, designated as required reading by the instructors, is available for circulation to Graduate School students. Other libraries in the District—The Library of Congress, Public Library and libraries of government agencies offer excellent opportunities for student research.

#### LIBRARY ASSISTANTSHIPS

A limited number of student assistantships are available to qualified students who wish to use this method of paying their fees. The type of work ranges from professional to clerical and is done after official hours. Those interested should inquire at the Graduate School office.

#### CORRESPONDENCE WORK

The Graduate School offers a limited number of correspondence courses intended primarily for the benefit of field employees of the Department of Agriculture. Other Federal Government employees are admitted as staff and facilities permit. Plans are in progress for expansion of this type of education. Persons who are interested may write the School for a special announcement on correspondence study. Persons living within commuting distance may not take courses by correspondence.

When enrollment in a local area is sufficient in one course, and employees express their desire for the service, the Graduate School will attempt to supplement the instruction by local supervision and group meetings. A small additional fee will be charged for this service, the amount depending on the number of persons participating.

The correspondence course program will be expanded as interested USDA personnel request it. Employees who wish at once to take courses not offered, may write the School for information as to where desired courses may be secured. The School will be glad to inform employees of institutions offering the courses, and of the costs and credits involved.

#### LECTURES AND PUBLICATIONS

At least one lecture series dealing with a major current problem is offered each year. Several of the lectures have been published and are available as Graduate School publications. (See list on outside back cover.)

During the 1946-47 school year special lecture series will be offered in Biological Sciences, Mathematics and Statistics and Public Administration. More complete information may be found in the respective Departments.

## ACCREDITMENT

The Graduate School does not grant degrees and has never sought that authority; therefore it has not asked to be accredited by any of the accrediting agencies. It prefers to give courses of standard graduate and undergraduate grade; to have the merits of these courses judged by the caliber and well-known competence of its instructors; and to cooperate with existing institutions having degree-granting authority.

The United States Civil Service Commission accepts Graduate School credits, the same as those from recognized colleges and universities, for examination and qualification purposes.

## GENERAL GRADUATE DEGREE REQUIREMENTS

To aid the student in planning his program, degree requirements are summarized below.

*Consultation with Graduate Deans.* Graduate students should arrange their programs in advance through the dean of the graduate school of the institution from which the student contemplates taking his degree. Latest catalogs of colleges and universities are available for examination in Department of Agriculture Library.

*Master's Degrees.* Degree-granting institutions will generally permit six semester hours of graduate credit to be transferred from another institution, including the Graduate School of the Department of Agriculture. Some institutions, including some in the District of Columbia, require that all study for the Master's degree be taken in residence. In some institutions more than six hours may be transferred from the Graduate School of the Department of Agriculture when the additional work is taken with the approval of the head of the student's major department and the graduate dean in the degree-granting institution.

*Doctor's Degrees.* Almost universal academic practice permits the graduate student to complete two of the three years' work necessary for the doctorate outside the degree-granting institution, or a year beyond the Master's degree. The last year must be taken in residence.

*Undergraduate Deficiencies.* Graduate schools generally permit deficiencies to be made up out of residence. Those students who have deficiencies pointed out by their graduate deans may make them up in the undergraduate courses offered by the Graduate School of the Department of Agriculture.

*Language Requirements.* It is possible for graduate students to do all their preliminary language requirements and introductory course requirements subject to optional examination by the degree-granting institution.

**CERTIFICATION**

*Inclusion in Personnel Record.* To aid its promotion-from-within policy, the Department of Agriculture has provided that Graduate School credits earned by its employees will be placed in official personnel files. Personnel Circular No. 144, September 22, 1944, provides:

- A. In order that supervisors or others seeking qualified candidates for vacancies may know that a given employee has completed courses in the Graduate School, it is desirable that a record of such course completion be included in the employee's bureau personnel file and the personnel file maintained by the Central Office of Personnel. The inclusion of such information is of great importance in effecting the Department's promotion-from-within policy.
- B. To accomplish this purpose the following procedure will be used:
  1. Unless specifically requested by the employee that such action not be taken, the Graduate School will forward, upon completion of courses or at the end of the year, two copies of the student's record, without cost to the employee, to the personnel officer of the administration, bureau or office in which the student is employed.
  2. The bureau concerned will dispose of the copies as follows:
    - a. Place one copy in the employee's bureau personnel file.
    - b. Transmit one copy to Division of Employment, Office of Personnel, for inclusion in the employee's official personnel file.

*Certification on Request.* Upon a student's written request, an official certification bearing the seal of the Graduate School will be sent to him or to an organization designated by him. The fee for this service is 50 cents a copy prepaid. Certification of record for academic credit to be transferred to a college or university will not be made unless the student has filed with the Graduate School a transcript of his previous academic work.

**CERTIFIED STATEMENTS OF ACCOMPLISHMENT**

Certified Statements of Accomplishment are offered in the fields of Accounting, Administrative Procedures, Public Administration, Social Sciences, and Statistics upon the student's completion of specified programs of study. For complete details see the outlined program in the Department concerned.

These statements are offered to encourage the student to complete a well-rounded approach to his chosen field of study or work, so that he may more competently discharge his present and prospective responsibilities as a public servant. Courses completed and the quality of accomplishment are recorded on the back of the statement which may be used as a personal record of achievement or a public record of qualification.

#### FELLOWS AND INTERNS

Each year the Department of Agriculture, in cooperation with the Department of State, provides to representatives of the other countries graduate fellowship opportunities for study, observation, and training in the United States. The program is designed to provide additional training for serious, competent scientists and professional men in the improvement of agriculture and living conditions in the world. Its aim is to develop public-minded leaders who are able to carry full public and professional responsibilities. The Graduate School cooperates in this undertaking by granting honorary graduate fellowships to these students. The School also participates in the Departmental committee that formulates the general programs for this group.

The National Institute of Public Affairs works with colleges and universities and with Federal agencies in Washington in providing annually an internship program for a group of college graduates, competitively selected from the country at large. The Department of Agriculture for several years has cooperated in this undertaking by furnishing selected training and internship opportunities for trainees from the Institute. The Graduate School cooperates by granting to such interns, whether in the Department of Agriculture or in other Federal agencies, graduate fellowships for study in the School.

For special intern program in Statistics see p. 33.

### Regulations and Procedures

#### ADMISSION

Admission to resident courses in the Graduate School is open to all qualified employees in the Federal service, and to such other qualified individuals as facilities will permit.

#### VETERANS

Graduate School courses are available to veterans of World War II under the provisions of Public Laws 346 and 16. Registration

for part-time study is charged against educational benefits only in the proportion that the number of semester hours bears to a full normal load.

Veterans intending to enroll in the Graduate School should apply as soon as possible to the Regional Office of the Veterans Administration for an official certificate showing the amount of educational benefits to which they are entitled. This letter of entitlement will be accepted by the Graduate School in lieu of tuition fees and charges for books and supplies.

In cases where an official certificate has not been received prior to the time of registration, the veteran will be required by the Graduate School to pay at least one half of his tuition plus whatever fees may be applicable, with the understanding that this will be refunded retroactive to the effective date on the letter of entitlement.

#### REGISTRATION REGULATIONS

*Registration.* Registration is during the periods scheduled in the School calendar. Students will register in the School office, Room 1031 South Building, or in such other rooms as will be designated. After Friday, October 4, students may enroll for credit only with the approval of the instructor and the Registrar. Mail registration forms will be supplied on request. Registration is not completed until the required fees have been paid. When the limitation set for each course is reached, registration for that course is closed. The Graduate School reserves the right to cancel any course if registration does not warrant continuance.

*Opening Date.* The twenty-sixth year of the Graduate School opens Monday, September 23, 1946. All classes begin during the week starting on that date. The fall and spring semesters run fifteen weeks each.

#### FEES

*Course Fees.* In general, fees are computed at \$8.00 per semester hour credit for strictly undergraduate courses and \$9.00 per semester hour for graduate and advanced undergraduate courses.

Fees may be paid in cash in full at the time of registration or in two installments: half the course fee plus a \$1 service charge at the time of registration; the payment for the second half must be made on or before the date given in the School Calendar.

*Late Fee.* There will be a \$1 late registration fee and a \$1 late transfer fee as shown in the School Calendar.

*Laboratory Fee.* Laboratory or materials fees are listed in connection with the courses for which they are charged.

*Transcript Fee.* There will be a fee of 50¢ for each copy of a student's record on the regular Graduate School blank or on the blank of another institution or state board of education.

### WITHDRAWAL

*Procedure.* Students who wish to withdraw from a course must make written application at the School office.

### REFUNDS OF FEES

*Refunds.* Students withdrawing from classes will not be entitled to refund except that—

1. When a student is granted permission to withdraw from a course on or before October 4, his fee, minus a \$3.00 registration charge will be refunded.
2. When a student is OFFICIALLY transferred out of the Washington area or leaves Washington to enter the armed forces, his fee, minus a \$3.00 registration charge for each course, will be refunded in the amount proportionate to the unexpired portion of the semester, provided written evidence of such transfer or induction is presented. This does not apply to cases arising out of the student's voluntary action.

All adjustments are made as of the date on which application for refund is received.

### CLASSIFICATION OF COURSES

1. The courses of study offered are classified according to aim, amount of advancement, or subject matter.
2. According to amount of advancement, some courses are for undergraduates only, others for undergraduates of sufficient maturity or graduates, and still others for graduates alone.
3. Courses are numbered according to degree of advancement of the course: below 100, non-credit; 100-399, undergraduate; 400-699, graduate and advanced undergraduate (senior); above 699, graduate.
4. The value of the course in semester hours is given below the course title.

### COURSE PREREQUISITES

Undergraduate courses, in general, are open to persons who are graduates of a standard high school or equivalent or who qualify

for the course because of satisfactory work experience. For admission to more advanced courses college work in the same or related field is specified or understood. For other courses definite prerequisite may be stated. Year courses require the completion of the work of the first semester or its equivalent.

#### SEMESTER COURSE LOAD

Students employed full time are not expected to carry more than two courses. Should they wish to register for an additional course, permission must be secured from the Registrar.

#### ATTENDANCE REGULATIONS

Regular class attendance is necessary for the best attainments by the student in his academic work. However, it is recognized that circumstances may necessitate occasional absences. Arrangements for making up missed work must be cleared with the instructor. Where students carrying undergraduate courses are absent more than 25% of the class periods they will receive a mark of "W," withdrawn.

#### CREDIT AND GRADES

*Academic Credit.* Persons registering for academic credit must satisfy all prerequisites for admission to the course as generally stated or specified in the course description.

*Audit.* An auditor must meet the same prerequisites as a credit student. He receives full privileges of class participation if he chooses to exercise them. An auditor does not receive a grade; he receives only a mark of AUD.

*Grades.* At the close of the semester students registering for credit receive written notice by mail of grades received.

#### TRANSFER OF CREDIT

Students who wish credit transferred to collegiate institutions must, of course, meet in all particulars the requirements of the institution to which the credits are to be sent.

#### ROOM SCHEDULE

Room schedules, insofar as practicable, will be listed in the Time Schedule Bulletin which will be available after August 1. Complete class schedules will be posted after September 18 on bul-

letin boards outside Room 1031, and in the north entrances of the fourth and seventh wings of the South Building.

—o—

The Graduate School reserves the right to cancel any course if registration does not warrant continuance; to make any changes deemed advisable in registration and in fees; to require the withdrawal of any student at any time for such reasons as the School deems sufficient.

# Department of Biological Sciences

## DEPARTMENTAL COMMITTEE

HOWARD P. BARSS, M.S., Principal Botanist and Experiment Station Administrator, Office of Experiment Stations, Agricultural Research Administration, USDA (Chairman)

F. C. BISHOPP, Ph.D., Assistant Chief, Bureau of Entomology and Plant Quarantine, Agricultural Research Administration, USDA

EDWARD H. GRAHAM, Ph.D., Chief, Biology Division, Soil Conservation Service, USDA

M. A. McCALL, Ph.D., Assistant Chief; Bureau of Plant Industry, Soils, and Agricultural Engineering; Agricultural Research Administration, USDA

LESLIE A. SANDHOLZER, Ph.D., Bacteriologist, In Charge, Fishery Technological Laboratory, Fish and Wildlife Service, Department of Interior

BENJAMIN SCHWARTZ, Ph.D., Chief, Zoological Division, Bureau of Animal Industry, Agricultural Research Administration, USDA

WILLARD H. WRIGHT, Ph.D., Chief, Zoology Laboratory, National Institute of Health, U. S. Public Health Service, Federal Security Agency

R. Y. WINTERS, Ph.D., Research Coordinator, Agricultural Research Administration, USDA

—O—

*Course Numbers and Symbols*—Below 100, non-credit; 100-399, undergraduate; 400-699, graduate and advanced undergraduate (senior); above 699, graduate. Bracketed numbers, not given this year.

—O—

## SPECIAL LECTURES IN THE BIOLOGICAL SCIENCES \*

In recent years noteworthy advances have occurred in knowledge of animal and plant breeding, human and animal nutrition, control of diseases and insects, and in the use of antibiotics in medicine and related fields. A few typical developments are the current production and use of penicillin and DDT, plant and animal hybrids, increased knowledge of nutritionally important vitamins, and the creation of useful new types of animals such as Columbia sheep and a small-type turkey.

To give persons engaged or interested in biological studies an up-to-date account of progress, the Graduate School's Department of Biological Sciences has organized five series of lectures. Speakers will include prominent scientists from industry, Government and state research institutions.

A complete schedule of topics, lecturers and time of meetings will be available in the Graduate School office after August 20, 1946.

\* Persons desiring credits for courses numbered 600, 603, 605, 608 and 700 will submit, for the approval of the instructor, at the beginning of the semester, a topic for special study. Credit will be awarded on the basis of papers submitted. Those not desiring credit should register as auditors.

## 700. Progress in the Field of Antibiotics

Fall, 2 credits      GEORGE W. IRVING, JR., HORACE T. HERRICK and SPECIALISTS

Lectures on various aspects of the development, production and use of antibiotics by visiting lecturers familiar with their particular subjects, such as:

ROBERT D. COGHILL, Ph.D., Director of Research, Abbott Laboratories, Chicago, Ill.

A. B. CRAWFORD, D.V.M., In Charge, Animal Disease Station, Bureau of Animal Industry, Agricultural Research Administration, USDA

J. O. HEISHMAN, D.V.Sc., In Charge of Research in Mastitis of Cattle, Bureau of Animal Industry, Agricultural Research Administration, USDA

C. S. KEEFER, M.D., Evans Memorial Hospital, Boston, Mass.

KENNETH B. RAPER, Ph.D., In Charge, Culture Collection Section, Northern Regional Research Laboratory, Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, USDA, Peoria, Ill.

O. WINTERSTEINER, Ph.D., Head, Division of Organic Chemistry, The Squibb Institute for Medical Research, New Brunswick, N. J.

SELMAN A. WAKSMAN, Ph.D., Professor of Microbiology, New Jersey State Agricultural Experiment Station, New Brunswick, N. J.

Lecture topics will include the following: Role of microorganisms in the production of antibiotic agents; artificial production of high-yielding strains of microorganisms; chemistry of penicillin; assay of the several penicillins and relationship between assay and clinical effectiveness; commercial production of penicillin; clinical use of penicillin; development, chemistry and clinical use of gramicidin; development of streptomycin; chemistry of streptomycin; clinical use of streptomycin; present knowledge concerning the chemistry and clinical usefulness of other antibiotic agents produced by microorganisms; antibiotics in veterinary medicine; antibiotics produced by green plants and their significance in plant and animal disease; future of antibiotics in medicine. *Prerequisite:* Work in antibiotics or in related fields.

## 600. New Developments in Animal Breeding

Spring, 2 credits

(To be announced)

A survey of important developments in livestock reproduction and improvement, including physiology of reproduction, environmental and genetic factors affecting reproduction, inbreeding, cross-breeding, hybridization, grading up, heritability of economically important characters, measures of performance, artificial insemination and its application, and breeding for adaptability to the environment. *Prerequisite:* Course in principles of genetics or its equivalent.

## 603. Advances in Plant Breeding

Fall, 2 credits

F. J. STEVENSON and SPECIALISTS

A survey of recent developments in plant breeding, including the utilization of hybrid vigor in alfalfa production; progress in developing hybrid onions; new developments in breeding grasses and other field crops; and recent information on photoperiodic responses of plants and techniques for propagating plants in the greenhouse. Where possible, the information will be presented by specialists in the various fields. *Prerequisite:* A course in the principles of genetics or its equivalent.

## 605. Advances in Insecticides and Fungicides

Fall, 2 credits

M. C. GOLDSWORTHY, F. C. BISHOP and SPECIALISTS

A discussion by outstanding specialists of the place of insecticides and fungicides in human economy. The chemistry, manufacture, pharmacology, compounding, methods of application and usefulness of insecticides and fungicides in protecting man, clothing, buildings, houses, barns, livestock, gardens, fruit, field crops, forests, and stored products from insect and fungus attack. Discussion of practical problems in the application of insecticides, fumigants, and fungicides. *Prerequisite:* Basic courses in biology and chemistry or consent of instructors.

**608. Recent Advances in Animal and Human Nutrition**

Year, 2 credits each semester \* HERBERT R. BIRD, ELIZABETH C. CALLISON, IMOGENE P. EARLE, LANE A. MOORE and SPECIALISTS

Consideration will be given to the most recent investigations underlying the principles of animal and human nutrition and will include discussion of (1) the non-dietary essentials, their nature, distribution and preservation, and the deficiency diseases resulting from their deprivation; (2) evidences and existence of still unidentified nutrients; (3) the relationship existing between hormones and nutrition; (4) human nutrition status as affected by dietary habits; and (5) relationship between animal feeding practices and human nutrition. The nutrition of poultry, swine, sheep, horses, dairy and beef cattle, and humans will be covered in this course. *Prerequisite:* Courses in biology, organic chemistry or physiology.

**Current Policy Problems of American Agriculture** (*See p. 91*)

**Patent Law for Executive and Scientific Personnel** (*See p. 114*)

**World Agriculture** (*See p. 97*)

**Standards of Living** (*See p. 89*)

**[206.] Useful Plants of the American Tropics**

**[207] Land Management Ecology**

**Farm Management** (*See p. 93*)

**209. Systematic Botany**

Year, 2 credits each semester

SIDNEY F. BLAKE

Intended to give those with no previous experience in systematic botany an acquaintance with the elementary principles of the subject sufficient to enable them to use the ordinary manuals to advantage. The second semester is devoted to the identification of wild plants of this region by the use of a manual. One or two short field trips will be held.

**310. Background and Development of Biological Sciences**

Fall, 2 credits

JOSEPH EWAN

History of plant and animal science from the earliest times to the present; major topics of biological investigation; development of established theories; introduction to biography; impact of biological fact and theory upon contemporary literature and the arts.

Intended to acquaint persons interested in plants and animals with the dramatis personae of the biological sciences along with some awareness of the life and times of the principal figures. Lectures, discussion and examination of selected herbals and classics of biology. Persons registering for credit will complete additional collateral readings.

**512. Medical and Veterinary Entomology**

Year, 2 credits each semester

F. C. BISHOPP

A timely general course in medical entomology with emphasis on the practical aspects of this important field. The biology, habits, and relation to disease of insects, spiders, mites, and ticks, are discussed. How these arthropods affect man and animals as intermediate hosts, or carriers of disease-producing

\* This course is so arranged that students may attend both semesters or either semester. No subject matter, however, will be repeated.

organisms, is given attention and special consideration is given methods of control. The adaptation of known control procedures to present-day problems is considered. Features of the course include lectures by outstanding specialists in this general field and round-table discussions of practical problems. *Prerequisite:* Basic training in entomology or consent of instructor.

**[554.] Advanced Plant Ecology**

**[555.] Plant Physiology**

**[556.] Plant Biophysics**

**Design and Analysis of Complex Experiments** (See p. 39)

**Landscape Development of the Small Property** (See p. 117)

## Department of Languages and Literature

### DEPARTMENTAL COMMITTEE

HARRY B. HUMPHREY, Ph.D., Principal Pathologist (retired), Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, USDA (Chairman)

GEORGE E. BEAUCHAMP, Ph.D., Chief, Publications Control Unit, Bureau of the Budget

MARJORIE C. JOHNSTON, Ph.D., Specialist in Spanish, U. S. Office of Education

J. KENDALL McCLAREN, Head, Division of Information, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, USDA

M. C. MERRILL, Ph.D., Chief of Publications, Office of Information, USDA

RALPH R. SHAW, M.S., Department Librarian, USDA

ROBERT L. WEBSTER, M.S., Assistant Director of Information, Office of Information, USDA

—O—

### IMPORTANCE OF ENGLISH WRITING AND SPEECH

Among students preparing for technical careers and among busy people employed on the basis of their technical competence, there is an inevitable tendency to concentrate on subject-matter specialties, to the great neglect—if not exclusion—of the auxiliary subjects that can effectively implement such specialties. It is common knowledge in the Government service that nothing so much retards the progress of many young technicians, scientists, and other professional personnel as their inability to incorporate the results of their thinking and of their research in effective, concise, lucid English, written or oral. Technical knowledge is of no value unless it can be communicated to others. There are indeed few persons who cannot greatly benefit from the further sharpening of their tools of communication.

The major objective of the courses in writing and speech is the development of facility of expression, both oral and written, so that thoughts and feelings can be presented clearly, interestingly, and convincingly.

—O—

*Course Numbers and Symbols*—Below 100, non-credit; 100-399, undergraduate; 400-699, graduate and advanced undergraduate (senior); above 699, graduate. Bracketed numbers, not given this year.

—O—

### ENGLISH

#### 222<sup>a</sup>. Composition and Rhetoric

Fall, 3 credits. Repeated in Spring

FRANCES H. MILLER

Equivalent of freshman English. An introductory course in writing and English usage, designed especially for those who need a course preparatory to

more advanced English studies. Special attention given to the fundamental principles and mechanics of good writing—grammar, punctuation, spelling, dictation, etc. Exercises in writing short and long themes and in studying, analyzing, and evaluating selected English prose texts.

### **222<sup>b</sup>. Composition and Rhetoric**

Spring, 3 credits

ROMAIN G. GREENE

Continuation of course 222<sup>a</sup> above.

### **223. Descriptive English Grammar**

Fall, 2 credits. Repeated in Spring

SUSAN E. HARMAN

KATHRYN WARD

A course in grammatical principles, stressing sentence structure and correct English form. Exercises in diagramming and analyzing sentences and in correcting examples of English.

### **51. English for Foreign Students**

Fall, non-credit. Repeated in Spring

HELEN W. WILLIAMS

A course in college English designed to meet the needs of students with a foreign-language background. Includes study of idiom and anomalous and difficult grammatical constructions; vocabulary; and practice in correct and fluent expression in writing and speaking.

### **Practical English Usage**

(See p. 47)

### **Vocabulary Building**

(See p. 47)

## WRITING AND EDITING

### **224. Creative Writing**

Fall, 2 credits. Repeated in Spring

DELIGHT HOLT

Primarily this course aims to develop the student's inclination to practice writing through guidance and example. Emphasis is laid on facility of expression. The course presupposes fundamental knowledge of composition. Stories, sketches, articles, book and magazine reviews, personal letters, and letters to editors are assigned work.

### **225. Editing**

Fall, 3 credits

M. C. MERRILL and SPECIALISTS

Limited to 40 students.

Intended primarily for those seeking information on editorial techniques involved in handling manuscripts after they leave the author's hands and until they are issued in printed form. Discussion of the fundamental principles of editing, including the organization or rearrangement of material for effective presentation; rhetorical style in relation to subject matter; sentence structure and effective use of English; paragraphing and leads; consideration governing titles, tables of contents, headings, footnotes, illustrations, literature citations and bibliographies, and statistical checking; the principles of table formation and arrangement; typography and the relation of type to subject matter; and the fundamentals of indexing and proofreading. Practical examples of editorial work are discussed in class. Opportunity for some familiarity with the style manual of the Government Printing Office is provided. Collateral reading is indicated. Those desiring credit for the course are required to pass a written examination at the end of the semester.

**237. Government Printing Procedure**

Fall, 1 credit. Repeated in Spring

LOUIS H. ANDERSON

Intended for those whose task it is to make arrangements for the printing of books, pamphlets, posters, folders, charts, forms, and other printed matter, and who deal with author or editor and the printer. Subjects covered include: analysis of the manuscript and its purpose to determine the format of the printed piece; copy fitting and measuring; organization of copy; economy of attention of the reader; legibility and readability; type faces and typography; illustrations; printing processes; paper; binding; preparation of copy for the printer, handling of proofs; specifications and cost factors. The knowledge of methods and procedures to be acquired from this course is intended to give the students competence and confidence in dealing with author, editor, and printer.

**226<sup>a</sup>. Writing for Official Purposes**

Fall, 2 credits

J. KENDALL MCCLAREN and SPECIALISTS

How to present facts and ideas in official writing is the problem of this course. Every type of writing has its own requirements. Official writing, though like other writing in most respects, has important peculiarities. For example, it must respect the boundaries of science, of governmental organization, and of official policy. Frequently the attempt to do so makes it wordy, wooden, and lifeless. The course, which presupposes some writing experience, considers ways of making government writings clear, vigorous, and readable in spite of the necessary rules and restrictions. It shows where the limitations do not apply, as well as where they do, so that all possible freedom may be developed. One major writing project is required to earn credit for the course.

**226<sup>b</sup>. Writing for Official Purposes**

Spring, 2 credits

FRANK THONE

This course will present informally the elements of popular writing on scientific and technical subjects, with special attention to the requirements of newspapers and general magazines. The seminar method will be followed as far as practicable, and as much practice in actual preparation of copy as possible will be given. *Prerequisite:* Course 226<sup>a</sup> or consent of instructor.

**Systematic Coordination of Management Directives**

(See p. 48)

**Government Letter Writing**

(See p. 47)

**SPEECH****COMMITTEE ON SPEECH**

GEORGE E. BEAUCHAMP, Ph.D., Chief, Publications Control Unit, Bureau of the Budget (Chairman)

WALTER B. EMERY, Ph.D., Special Assistant to Commissioner, Federal Communications Commission      HESTER B. PROVENSEN, LL.B., Assistant Professor, Department of Speech, University of Maryland

RUDOLPH FLESCH, Ph.D., Information Specialist, Office of Price Administration

**228. Fundamentals of Speech**

Fall, 2 credits

HESTER B. PROVENSEN

Through the preparation and delivery of short original speeches the student gains poise, assurance, and the ability to express himself clearly and accurately. Strict adherence to time limit quickens mental processes and develops discrimination in the selection of speech material. Voice, articulation, and pronuncia-

tion drills. Posture, movement, and gesture. Learn to speak by speaking at each class meeting. Constructive criticism.

### 229. Effective Speaking

Spring, 2 credits

HESTER B. PROVENSEN

Theory and practice of effective speaking through: (1) Audience analysis, (2) organization of speech material to achieve a specific response, (3) delivering speeches for special occasions (radio, good will, welcome, presentation, acceptance, etc.), (4) planning an interesting and dramatic meeting, (5) officiating at banquets. Each student speaks at every class meeting. It is assumed that the student has some knowledge or experience in speech making.

### 400. Advanced Public Speaking

Spring, 2 credits

GEORGE E. BEAUCHAMP

A course designed for persons who have previously had a beginning course or some practical experience in public speaking. Special attention is given to organization of speeches, types of speeches, and effective delivery.

### 232. Voice and Remedial Speech

Fall, 2 credits. Repeated in Spring

WALTER B. EMERY

Study and intensive drills in voice production, flexibility, range, articulation, and enunciation. Training and practice are designed to improve vocal conditions for all speech purposes and to remedy minor speech difficulties. In order that students may receive more individual attention, registration is limited to twenty. Recording equipment will be used.

This course is intended to improve the normal voice and minor speech difficulties. Prospective students with major speech difficulties are urged to consult with the instructor or Graduate School counsellors.

### 350. Effective Meetings

Fall, 2 credits. Repeated in Spring

DOUGLAS J. ENSMINGER and J. L. BOATMAN

What makes a meeting successful? Why have a meeting? How to hold an effective meeting? This course will give students the answer to these and other questions dealing with the conduct of meetings. Special attention will be given to the cultural and psychological factors in group activity. Opportunity will be given students to put the principles taught into actual practice under supervision. This course will be of value to all persons interested in group relationships, including rural and civic groups of all kinds and with day to day agency administration and inter-agency cooperation.

### 305. Radio and the Human Voice

Spring, 2 credits

E. J. ROWELL

Recordings are being used to supplement pictures as a part of family records and as a means of exchanging greetings. What is a good radio voice?

This course is designed for those who are interested in broadcasting the human voice, pointing up the desirable qualities which make for radio broadcasting. A condensed study of our two languages, that for the ear and that for the eye, will be made. Exercises in voice control, microphone techniques, and practice recordings for business and pleasure will be provided.

### 43. Personal Development

Fall, non-credit. Repeated in Spring

HESTER B. PROVENSEN

Discovery and development of potentialities of each student. Poise, confidence, appearance, make-up, dress and color sense, art of conversation, and cultivation of wider range of interest and curiosity. Actual social situations created and discussed. Conferences, guest speakers.

## LITERATURE

## 327. Current Books

Fall, 1 credit. Repeated in Spring

MARY-CARTER ROBERTS

This course will be divided between fiction and non-fiction. In both groups treatment will be given (a) books which have lasting literary merit, (b) books which deal with significant current questions, and (c) books which have attained striking popularity. The periods will be divided between the lecture by the instructor and a discussion by the students. The aim of the course is to encourage a conscious attitude of discrimination toward current writing.

## IMPORTANCE OF FOREIGN LANGUAGES

The events of World War II and the unprecedented expansion of all kinds of international activities have greatly increased interest in nearly all foreign languages. Research workers, those employed in all aspects of international relations, and those scheduled for foreign assignments are in need of foreign-language instruction. With the expansion of international land, water and air transportation many persons will want to improve their facility of speech in some foreign language before visiting our world neighbors.

The Graduate School provides opportunities for instruction in a wide range of foreign languages. It is the aim of those responsible for these courses to conduct them so as to develop in their students a ready and intelligent use of the language. The person who is seeking the maximum practical value from a foreign language must learn not only to translate it but to think in it well enough for translation to be unnecessary. He should acquire a spoken command of at least one language other than his own. No one should be content with a smattering of a language. He should attempt to perfect his skill in it until the language becomes a useful auxiliary means of communication.

—O—

Unless otherwise specified, all foreign language courses are organized as follows:

*Elementary year*—foundation work in grammar, vocabulary, reading, and translation, with some conversation.

*Intermediate year*—grammar review, more difficult reading and translation, use of idioms, writing and discussion in the language.

*Conversation*—development of facility in discussion and reading, use of idioms, writing and thinking in the language without translating.

*Note: Course numbers followed by (a) are first-half of that course, or by (b) are second-half.*

## DIRECTED LANGUAGE STUDY

In some languages and in specialized scientific fields, enrollment is insufficient to justify offering instruction on a regular basis. If fifteen or more students inform the Graduate School Office of their

wish to take advanced work in a language, a class may be organized in which students will proceed with their study on an individual basis under the instruction of a teacher who will guide their study.

### ARABIC

#### 233<sup>a</sup>. Elementary Arabic

Fall, 2 credits

OLIVER F. EGLESTON

#### 233<sup>b</sup>. Elementary Arabic

Spring, 2 credits

OLIVER F. EGLESTON

### CHINESE

#### 238<sup>a</sup>. Elementary Chinese

Fall, 4 credits

I-MIEN TSIANG

An introductory course in the fundamentals of the Chinese language (Mandarin): elements of grammar, reading and writing of Chinese characters, and simple conversation.

#### 238<sup>b</sup>. Elementary Chinese

Spring, 4 credits

I-MIEN TSIANG

### FRENCH

#### 253<sup>a</sup>. Elementary French

Fall, 3 credits

HARRY B. HUMPHREY

#### 253<sup>b</sup>. Elementary French

Spring, 3 credits

HARRY B. HUMPHREY

#### 254<sup>a</sup>. Intermediate French

Fall, 3 credits

HARRY B. HUMPHREY

#### 254<sup>b</sup>. Intermediate French

Spring, 3 credits

HARRY B. HUMPHREY

#### 255<sup>a</sup>. Conversational French

Fall, 3 credits

OLGA LONGI

#### 255<sup>b</sup>. Conversational French

Spring, 3 credits

OLGA LONGI

### GERMAN

#### 259<sup>a</sup>. Elementary German

Fall, 3 credits

MAX LEDERER

#### 259<sup>b</sup>. Elementary German

Spring, 3 credits

MAX LEDERER

#### 260<sup>a</sup>. Intermediate German

Fall, 3 credits

JOSEPH PONTI

**260<sup>b</sup>. Intermediate German**

Spring, 3 credits

JOSEPH PONTI

**261<sup>a</sup>. Conversational German**

Fall, 3 credits

MAGNA E. BAUER

## ITALIAN

**270<sup>a</sup>. Elementary Italian**

Fall, 3 credits

JOHN ROSSETTI

**270<sup>b</sup>. Elementary Italian**

Spring, 3 credits

JOHN ROSSETTI

**271<sup>a</sup>. Intermediate Italian**

Fall, 3 credits

JOHN ROSSETTI

**271<sup>b</sup>. Intermediate Italian**

Spring, 3 credits

JOHN ROSSETTI

## JAPANESE

**275<sup>a</sup>. Elementary Japanese**

Fall, 3 credits

JOSEPH G. YOSHIOKA

**275<sup>b</sup>. Elementary Japanese**

Spring, 3 credits

JOSEPH G. YOSHIOKA

## PORTUGUESE

**290<sup>a</sup>. Elementary Portuguese**

Fall, 3 credits

RAUL D'ECA

**290<sup>b</sup>. Elementary Portuguese**

Spring, 3 credits

RAUL D'ECA

## RUSSIAN

**295<sup>a</sup>. Elementary Russian**

Fall, 3 credits. Repeated in Spring

GEORGE M. SAHAROV  
ERIC T. SCHULER  
EUGENIA TARAKUS**295<sup>b</sup>. Elementary Russian**

Fall, 3 credits. Repeated in Spring

GEORGE M. SAHAROV  
EUGENIA TARAKUS**296<sup>a</sup>. Intermediate Russian**

Fall, 3 credits

NATHALIE VON BRETZEL

**296<sup>b</sup>. Intermediate Russian**

Spring, 3 credits

NATHALIE VON BRETZEL

**299<sup>a</sup>. Advanced Russian**

Fall, 3 credits

GEORGE M. SAHAROV

**299<sup>b</sup>. Advanced Russian**

Spring, 3 credits

GEORGE M. SAHAROV

**[297.] Conversational Russian**

GEORGE M. SAHAROV

**Contemporary Russia**

(See p. 99)

**SPANISH****300<sup>a</sup>. Elementary Spanish**

Fall, 3 credits. Repeated in Spring

CONSUELO BATISTA  
MARJORIE C. JOHNSTON  
ARTHUR C. PARSONS**300<sup>b</sup>. Elementary Spanish**

Fall, 3 credits. Repeated in Spring

CONSUELO BATISTA  
MARJORIE C. JOHNSTON  
ARTHUR C. PARSONS**301<sup>a</sup>. Intermediate Spanish**

Fall, 3 credits. Repeated in Spring

MICHAEL LEVER  
MARCUS GORDON BROWN**301<sup>b</sup>. Intermediate Spanish**

Spring, 3 credits

MARCUS GORDON BROWN

**302<sup>a</sup>. Spanish Conversation and Literature**

Fall, 2 credits

RAFAEL SUPERVIA

**302<sup>b</sup>. Spanish Conversation and Literature**

Spring, 2 credits

RAFAEL SUPERVIA

**304. Commercial Spanish**

Fall, 3 credits

MICHAEL LEVER

Advanced composition in commercial correspondence; commercial geography, monetary systems, certificates and invoices, etc.; cable systems, insurance and banking abbreviations. Designed to give the intermediate student of Spanish familiarity with current commercial correspondence usage and ability to compose acceptable commercial correspondence. *Prerequisite:* One year of elementary Spanish or equivalent.

**574<sup>a</sup>. Advanced Spanish Conversation**

Fall, 2 credits

BALLINA G. MEDRANO DE SUPERVIA

Limited to students with four years in Spanish, including a course in conversation or its equivalent.

**574<sup>b</sup>. Advanced Spanish Conversation**

Spring, 2 credits

BALLINA G. MEDRANO DE SUPERVIA

**La America Latina y los Estados Unidos**

(See p. 102)

**World Politics**

(See p. 96)

# Department of Mathematics and Statistics

## DEPARTMENTAL COMMITTEE

W. EDWARDS DEMING, Ph.D., Adviser in Sampling, Bureau of the Budget (Chairman)

ALVA E. BRANDT, Ph.D., Research Specialist in Charge of Experimental Design and Analysis, Soil Conservation Service, USDA

JOHN H. CURTIS, Ph.D., Statistical Assistant to the Director, National Bureau of Standards

M. A. GIRSHICK, Ph.D., Principal Agricultural Statistician, Bureau of Agricultural Economics, USDA

MORRIS H. HANSEN, M.A., Statistical Assistant to the Director, Bureau of the Census

PHILIP M. HAUSER, Ph.D., Assistant to the Secretary, Department of Commerce and Assistant Director, Bureau of the Census

B. R. STAUBER, M.A., Chief, Division of Agricultural Price Statistics, Bureau of Agricultural Economics, USDA

O. C. STINE, Ph.D., Assistant Chief, Prices and Marketing, Bureau of Agricultural Economics, USDA

—O—

## OPPORTUNITIES FOR STUDY AND WORK

To a greater extent than ever before, our country is dependent on the analysis of quantitative data. Action in the solution of problems in industrial and agricultural production requires prediction, which in turn requires skill in the collection, evaluation, and analysis of data, plus knowledge of the subject matter gained through studies of economics, sociology, engineering, or other branches of the natural and social sciences. In industry and in Government service, the demand for valid methods of prediction as a basis for action is placing more and more stringent requirements on statistical methods, as more and more is expected of public programs designed to stabilize or improve economic and social conditions.

Indications point to good employment opportunities in statistical work during the next decade. In particular, the demand for highly trained specialists in statistical research and application in numerous fields is expected to exceed the supply several fold. The situation in Washington creates an unusual opportunity for students who wish to pursue studies in statistics. For years, Washington has more and more been becoming the center of many activities, political, economic, and scientific. Government statisticians, by the nature of their duties, must make predictions, recommend action, and face the consequences. They are daily faced with exacting realities and responsibilities; they are daily putting their statistical methods to test, and through research are developing new statistical methods to meet new and more exacting requirements. Some of the leading statisticians of Washington are giving courses in the Graduate School.

**CERTIFIED STATEMENTS OF ACCOMPLISHMENT**

A Certified Statement of Accomplishment is offered in each of three fields of statistical study—fields representing areas of statistical preparation and application most useful in the public service. The required program in each field is outlined below. The student who completes the basic courses and earns 24 credits in specialized courses listed in any column, with substitutions only as specifically approved, is eligible to receive a Certified Statement of Accomplishment. It certifies that the student has completed a program of study which, in conjunction with collateral training in a subject-matter field of application, prepares him for effective public service in a particular statistical field. (See pp. 11-12.)

**SUGGESTIONS FOR PROGRAMS OF STUDY**

The statistical method is the science of discovering assignable causes of variability in measureable phenomena, and of measuring the effect of these causes with the view of making predictions and thus to assist in the rational formulation of courses of action. Statistical work consists of planning and carrying out the collection, classification, analysis, interpretation, and presentation of quantitative data, and of developing methods for improving the precision and reliability of methods for doing this work at the lowest possible cost. The trained statistician is particularly equipped by training and experience to assist in the formulation of scientific courses of action in government, manufacturing, and distribution. He must know when data are needed and how much precision is required. The courses offered on the following pages accordingly provide training not only in theoretical principles, but training also in the administrative and research uses of data, as well as in the collection and processing of data and in the development and supervision of the minor skills necessary for carrying out statistical work.

A fundamental requirement of a good statistician is that he know the subject matter of the field that he is working in. Completion of a particular curriculum of study in statistics will not of itself produce a statistician. The student of statistics, aspiring to obtain a Certified Statement of Accomplishment, is expected to attain competence also in some subject-field such as economics, sociology, biology, agriculture, or engineering. The School will issue a Certified Statement of Accomplishment in statistics only after the Departmental Committee is satisfied that the student has attained such competence in addition to the completion of an approved curriculum of study in statistics.

People who do not intend to become professional statisticians but simply desire to learn the elements of statistics as a tool, or peo-

## COURSES LEADING TO CERTIFIED STATEMENTS OF ACCOMPLISHMENT IN STATISTICS

*With Concentration in One of the Following Fields of Application*

THE SOCIAL SCIENCES	THE NATURAL SCIENCES	MATHEMATICS	MATHEMATICS
		<b>BASIC COURSES—Required of all candidates</b>	
102. Algebra	102. Algebra	102. Algebra	102. Algebra
103. Trigonometry and Analytic Geometry	103. Trigonometry and Analytic Geometry	103. Trigonometry and Analytic Geometry	103. Trigonometry and Analytic Geometry
127. Elementary Statistical Analysis	127. Elementary Statistical Analysis	206. Calculus	206. Calculus
	723. Design and Analysis of Complex Experiments	127. Elementary Statistical Analysis	127. Elementary Statistical Analysis
		<b>SPECIALIZED COURSES</b>	
206. Calculus	206. Calculus	500. Advanced Calculus	500. Advanced Calculus
520. Statistics of the Federal Government	704. Interpolation, Approximation, and Mechanical Quadrature	708. Linear Algebra	708. Linear Algebra
726. Interpretation of Statistical Calculations	723. Design and Analysis of Complex Experiments	712. Theory of Functions	712. Theory of Functions
729. Population Statistics	726. Interpretation of Statistical Calculations	723. Design and Analysis of Complex Experiments	723. Design and Analysis of Complex Experiments
735. Theory of Sample Surveys	731. Least Squares and Curve Fitting	735. Theory of Sample Surveys	735. Theory of Sample Surveys
717. Interview Survey Techniques in the Social Sciences	734. Statistical Methods for Research Workers	739. Multivariate Analysis	739. Multivariate Analysis
734. Statistical Methods for Research Workers	738. Introduction to Sampling and Statistical Inference	740. Analysis of Variance	740. Analysis of Variance
738. Introduction to Sampling and Statistical Inference	749. Control of Quality by Statistical Methods	741. Theory and Application of the Characteristic Function	741. Theory and Application of the Characteristic Function
753. Modern Developments in Statistical Economics	750. Theories of Acceptance Sampling	750. Theories of Acceptance Sampling	750. Theories of Acceptance Sampling
		<b>ELECTIVE COURSES</b>	
500. Advanced Calculus	732. Sampling in Social and Economic Surveys		
502. Differential Equations	733. Theory of Sampling		
704. Interpolation, Approximation, and Mechanical Quadrature	741. Theory and Application of the Characteristic Function		
712. Theory of Functions	752. Advanced Theory of Probability		
709. Theory of Infinite Processes			

ple who desire to train for clerical-statistical positions, should, of course, ignore the requirements for a Certified Statement and concentrate on basic statistical courses suited to their special needs.

The requirements set for statisticians by the United States Civil Service Commission vary with the level of position and the field of work involved. It should be noted that academic training in statistics is not of itself qualifying; where academic background in statistics is necessary there are other additional requirements such as general education, professional specialization, and experience.

It is suggested that those interested in taking courses related directly to their present assignment, and those uncertain as to which courses parallel the level of their training and backgrounds, consult with their supervisors. Attention is called again, in this connection, to the counseling services described on page 8.

#### SEMINARS IN SAMPLING

Seminars in sampling and statistical inference are held approximately six times a year under the direction of Dr. W. Edwards Deming. These meetings are held primarily for advanced students in the Graduate School, but are addressed and attended by the leading mathematical statisticians in the city. No fee is charged; registration, however, is required. Applications for new admissions to the seminar should be sent in writing to the Director, with a statement regarding the applicant's qualifications for attendance. Notices regarding meetings are sent to those whose names are on the list. The following meetings were held during the past academic year.

#### 1945

October 9 and 16. M. A. Girshick (Bureau of Agricultural Economics). Chairman: William G. Madow (Bureau of the Census). Sequential analysis.

November 9. William G. Madow (Bureau of the Census). Chairman: Col. Solomon Kullback (Army Security Agency). The selection of a sample in repeated steps.

#### 1946

January 11. Lt. Comdr. Joseph A. Daly (Bureau of Ships). Chairman: M. A. Girshick (Bureau of Agricultural Economics). Studentized distributions associated with the range.

January 18. Col. Leslie E. Simon (Director of the Ballistics Research Laboratory, Aberdeen Proving Ground). Chairman: Lawrence W. Shaw (Public Health). On sorting ammunition by statistical methods in the Normandy Invasion.

February 15. The sampling program of the Bureau of Internal Revenue. T. C. Atkeson. The general program. Lillian Robbins. The sample of individual income tax returns. A. C. Rosander. The sample of the returns of corporations.

February 21. Helen M. Humes (Bureau of Labor Statistics). Chairman: John Smith (Bureau of Labor Statistics). On sample design and field problems in connection with vacancy and rent surveys.

March 27. Morris H. Hansen (Bureau of the Census). Chairman: Comdr. J. Stevens Stock (Navy). On biased sampling and biased estimates.

April 4. Richard H. Blythe (Forest Service). Chairman: Earl P. Houseman (Bureau of Agricultural Economics). Statistical analysis of personnel performance.

#### OUTSIDE LECTURERS

The Graduate School has made a practice of bringing one or two outside leaders in statistical thinking to Washington annually. In the past, the following eminent authorities have lectured here: R. A. Fisher, John Wishart, Walter A. Shewhart, J. Neyman, Frank Yates, Harold Hotelling, and Harold Jeffreys. Some of these lectures are available in print; see the list of publications at the back. For fall 1946 two lecture series are in process of development, one by R. A. Fisher and a second series by P. C. Mahalanobis (Presidency College, Calcutta).

#### INTERNSHIPS IN SAMPLING

In recognition of the shortage of statisticians with thorough theoretical training and with experience in large-scale statistical projects under competent leadership, and in recognition of the exceptional facilities in Washington for specialized training in this field, the Graduate School has undertaken to present to qualified students the opportunity to pursue their studies under a system of internships. Under this program a limited number of people with the necessary background will have a unique opportunity to combine advanced study with practical experience in sampling. Approved candidates will undertake a program of approximately a year and a half in duration, consisting in part of theoretical training and in part of work-experience. The program will be planned on an individual basis, depending upon the work, training, and interests of the candidate.

The internships are open chiefly to two groups: first, those who have received their doctorates in mathematical statistics, or who have completed most of the courses necessary therefor; second, those

who have received their doctorates, or have acquired the equivalent, in some sister profession such as agricultural science, economics, sociology, social psychology, engineering, etc., and who have done some work in advanced mathematics and statistical theory. These internships carry no stipends.

The internship program will consist of two integrated parts:

- A. Theoretical, classroom training in courses at the Graduate School, or at other educational institutions in the city. This training will be planned to strengthen previous training and to fill gaps.
- B. Work experience in government agencies on large-scale statistical sampling programs. Included among the agencies to which interns will be assigned are:

Bureau of Agricultural Economics      Bureau of the Census

Bureau of the Budget

Bureau of Labor Statistics

The work will consist of assistance in the preparation of sampling plans; application and testing of new theory; writing instructions for use in the field, in the office, and for tabulation; computation of sampling errors; computation of costs; and actual experience in interviewing. Each intern will obtain his work experience under the supervision of a qualified representative of the agency to which he is assigned.

Only in the Federal service in Washington are there available varied facilities on the requisite scale for actual practice and development of new theory in sampling in social and economic surveys. Holders of internships will work in the practice of designing and analyzing sampling plans in social and economic surveys, such as censuses of population, agriculture, characteristics of labor-force, housing characteristics such as rent, vacancy, and characteristics of occupancy. The work program of the intern must meet with the approval of the agency to which he is to be assigned.

This program is under the immediate direction of a Committee on Internships in Sampling. The committee is composed of:

W. EDWARDS DEMING (Chairman)

W. F. CALLANDER, Assistant Chief for Agricultural Statistics, Bureau of Agricultural Economics, USDA

WILLIAM G. COCHRAN, Professor of Statistics, Institute of Statistics, University of North Carolina

MORRIS H. HANSEN

ARYNESS JOY WICKENS, Assistant Commissioner, Bureau of Labor Statistics, Department of Labor

FREDERICK F. STEPHAN, Professor of Sociology and Statistics, Cornell University

Each application will be reviewed and approved or rejected by this Committee. The Committee will also plan and supervise the program of each intern.

Upon satisfactory completion of the internship the individual will be awarded by the Graduate School a certified statement appropriately descriptive of the nature, extent, and quality of the training and work experience. In the case of pre-doctorate candidates credit will be transferable under arrangements worked out in advance with the institution in which the intern is a candidate for a degree. In certain cases the work experience may be used, with the approval and cooperation of the degree-granting institution, as the doctoral thesis or as the basis for it.

The number of internships available is limited, because it is essential that the field work of interns fit into and contribute to the going work program of the agency in whose area the fields of interest of the student are most closely related, and do not cause a diversion of manpower or facilities in connection with the work of the intern.

Applications should be made to the Director of the Graduate School and should include the following information:

(1) Name	(5) Fields of specific interest and circumstances surrounding application (i.e., purpose, whether applicant would devote full time to internship, etc.)
(2) Date and place of birth	
(3) Previous academic work	
(4) Citations or copies of publications or technical papers	

—O—

*Course Numbers and Symbols*—Below 100, non-credit; 100-399, undergraduate; 400-699, graduate and advanced undergraduate (senior); above 699, graduate. Bracketed numbers, not given this year.

—O—

## MATHEMATICS

### 1. Review of Freshman Mathematics

Fall, non-credit

EMIL SCHELL

A review course on the level of freshman mathematics. Algebra, trigonometry, analytic geometry. A brief introduction to the methods of the differential calculus. Emphasis on applications to statistical problems.

### 102. Algebra

Fall, 2 credits

C. H. GRAVES

Fundamental rules of algebra; exponents; logarithms; manipulations with proportions; identities and conditions; solution of equations; binomial theorem; numerical approximations. Uses of symbolic operators. Determinants; solution of equations by the reciprocal matrix. Theory of equations; progression; series. Permutations and combinations. Graphical methods. Emphasis on applications to statistics and the physical sciences. *Prerequisite*: High-school algebra, and plane and solid geometry.

**103. Trigonometry and Analytic Geometry**

Spring, 2 credits

C. H. GRAVES

Definitions in trigonometry; identities; complex numbers; DeMoivre's theorem; trigonometric equations. The study of analytic geometry will include the line, conic sections, and some other plane curves, polar coordinates; families of curves with one or more parameters. Parametric equations of curves. Radical axis. Graphic solution of equations. Some three-dimensional geometry. *Prerequisite:* College algebra.

**206. Calculus**

Year, 3 credits each semester. (Alternate years)

E. J. FINAN

*First semester.* Variables, functions, limits, continuity, divided differences, derivatives. Application of the derivative to geometry, physics, curve fitting, and analysis. Mean value theorem. The anti-derivative. Riemann integration. *Prerequisite:* Algebra and trigonometry and analytic geometry.

*Second semester.* Standard integral forms. Partial and total derivatives. Constrained maxima and minima in two variables; Lagrange multipliers. Interpolation. Taylor's series with one, two, and three variables. Propagation of errors. Series. Multiple integrals. Line integrals. Approximate integration; the Euler-Maclaurin formula for integration and summation. History and application stressed. *Prerequisite:* First semester or equivalent.

**307. Survey of College Mathematics**

Spring, 3 credits

EMIL SCHELL

A course covering the ideas and methods of modern mathematics, designed for students who wish to unify their mathematical training. Subjects treated consist of the theory of numbers, the number system, geometrical constructions, projective geometry, topology, functions, and limits. Emphasis will be placed upon the content and purpose of mathematical learning by appropriate illustrations from various fields. Text: Courant and Robbins, *What is Mathematics?* (Oxford, 1941). *Prerequisite:* Calculus, or consent of the instructor.

**[500.] Advanced Calculus (1948-49 and every third year)**

RICHARD K. COOK

**700. Vector Analysis**

Fall, 2 credits

A. WUNDHEILER

Development of the fundamentals of the algebra and calculus of vectors, for the treatment of statistical and engineering problems. Scalar and vector fields. Stokes', Gauss', and Greene's theorems. The hydrodynamical equations of continuity, Maxwell's hypotheses for free space. Applications of vector methods to topics of particular interest to members of the class is made as time permits. Text: Wills, *Vector Analysis*. *Prerequisite:* Calculus, plus either a year of college physics or a year of statistics.

**[502.] Differential Equations (1947-48 and every third year)**

RICHARD K. COOK

**[704.] Interpolation, Approximation, and Mechanical Quadrature (1948-49 and every third year)**

C. WINSTON

**715. Applications in Engineering Mathematics**

Year, 2 credits each semester. (Every third year)

RICHARD K. COOK

Graded problems in engineering used to illustrate fundamental mathematical techniques and methods of reducing physical statements to mathematical

form. Exact and approximate methods of solving the resulting mathematical equations. The mathematical treatment will include calculus, series, differential equations, difference equations, Fourier series and integrals, and other devices. Text: von Kármán and Biot, *Mathematical Methods in Engineering*. *Prerequisite:* A degree in engineering.

### 716. Introduction to Higher Geometry

Year, 2 credits each semester. (Every third year) MICHAEL GOLDBERG

Simplest curves and surfaces. Regular systems of points. Configurations. Differential geometry. Kinematics. Topology. Text: Hilbert and Cohn-Vossen, *Anschauliche Geometrie*. *Prerequisite:* Advanced Calculus.

### [706.] Analytical Mechanics (1948-49 and every third year)

RICHARD K. COOK

### [708.] Linear Algebra (1947-48 and alternate years)

M. A. GIRSHICK

### 709. Theory of Infinite Processes

Year, 2 credits each semester. (Every third year) C. WINSTON

Infinite aggregates. Convergent and divergent sequences. Theory of the real variable. Riemann and Lebesgue integration. Power series, expansion of functions, transformation and reversion of series. Continued fractions. Infinite determinants. *Prerequisite:* Advanced calculus or theory of functions; higher algebra advised.

### [712.] Theory of Functions (1947-48 and every third year)

C. WINSTON

### 751. Theory of Measure

Year, 2 credits each semester. (Alternate years) JOSEPH F. DALY

Review of theory of function of a real variable. Point set theory. Riemann integration, Lebesgue measure. Lebesgue and Stieltjes integrals. Applications to the theory of probability. *Prerequisite:* Theory of functions.

### [752.] Advanced Theory of Probability (1947-48 and alternate years)

JOSEPH F. DALY

## STATISTICS

### *Beginning Courses*

### 123. Survey of Statistics

Fall, 3 credits. Repeated in Spring

JOSEPH STEINBERG  
WILLARD SIMMONS

A one-semester non-mathematical course designed particularly to train statistical clerks in the fields of economics, sociology, and business. Algebra is reviewed as required. Operations with symbols. Summarizing data by tabulation and by statistical predictions. The Shewhart control charts. Randomness. Computations and interpretation of statistical functions. Correlation. Business indexes. Trend analysis and curve fitting. Graphic analysis. Instruction in calculations and table making. Short cuts by the use of charts, multiplication tables, logarithms, slide rule, and other devices.

**110. Graphic Methods of Presenting Statistics**

Fall, 2 credits. Repeated in Spring

R. G. HAINSWORTH and NELSON P. GUDRY

Application of various classes, forms, and types of illustrations. Examples in time series charts, frequency diagrams, graphic correlation charts, pictorial symbol charts, cartograms, and other illustrative examples; formation and spacing of appropriate lettering for such illustrations. Reduction, reproduction, and color application in relation to graphic presentation. *Prerequisite:* An introductory course in statistics or experience approved by the instructor.

**126. Introductory Statistics**

Year, 2 credits each semester

C. M. PURVES

The collection of economic and census data. The presentation of data in tables and charts. Different kinds of averages. Dispersion. Introduction to index numbers. Relations between two or more variables. Introduction to correlation theory, regression, and interpretation of samples. Practice in calculations. *Prerequisite:* High school algebra and geometry.

**127<sup>a</sup>. Elementary Statistical Analysis**

Fall, 2 credits. Repeated in Spring

JOSEPH STEINBERG, SAMUEL WEISS, FRANCIS P. HOEBER

Measures and significance of dispersion and other characteristics of distributions. Statistical control. Elementary principles of sampling and theory of errors. Design of surveys for the collection of economic and social data. Use of statistical tables, such as Tippett's, Fisher and Yates, and others. *Prerequisite:* College algebra; statistical experience advised.

**127<sup>b</sup>. Elementary Statistical Analysis**

Fall, 2 credits. Repeated in Spring

JOSEPH STEINBERG, SAMUEL WEISS, FRANCIS P. HOEBER

Relations between two or more variables. Association, correlation; regression and curve fitting. Tests of significance; estimation. Introduction to the analysis of variance. *Prerequisite:* Trigonometry and analytic geometry; elementary statistics; statistical experience advised.

**516. Intermediate Statistics**

Year, 2 credits each semester

BENJAMIN J. TEPPING

After a review of elementary principles and methods, a critical study is made of various topics, the purpose being to lay a foundation for effective work in statistical practice and for advanced study. Special attention is given to sampling and the uses of sample data. *Prerequisite:* Statistics 126 or 127.

**318. Machine Tabulation**

Fall, 1 credit. Repeated in Spring

MILTON KAUFMAN

The punch card method. Functions of the principal machines. Instruction covers actual wiring of all types of commercial and census tabulating equipment. Use of cards to obtain sums of squares and cross products in correlation and curve fitting is demonstrated. Registration limited to 30.

**319. Advanced Study of Tabulating Equipment**

Fall, 1 credit. Repeated in Spring

MILTON KAUFMAN

The solution of difficult problems in the application of tabulating equipment. The instruction includes the actual operation and wiring of the principal machines involved. *Prerequisite:* A course in machine tabulation.

**520. Statistics of the Federal Government**

Year, 2 credits each semester. (Alternate years)

MORRIS B. ULLMAN

Designed to give acquaintance with the wealth of data available from Federal agencies. Attention will be paid to the methods used by different agencies for the collection of data; comparisons of biases, definitions, and basic concepts; different methods of presentation. *Prerequisite:* Statistical experience in industry or the Government service or permission of the instructor.

*Advanced Courses***723. Design and Analysis of Complex Experiments**

Year, 2 credits each semester. (Alternate years)

A. E. BRANDT

O. A. POPE

A course intended to cover the design of problems in testing met in agriculture and industry, the purpose being to discover the least expensive procedure for obtaining the information that is needed. Long-range agricultural experiments will be studied. Efficient procedures in weighing; best allocation of points for finding the maximum of a function, or its zeros (Hotelling). Variance, correlation, and regression methods of analysis. *Prerequisite:* Intermediate Statistics; statistical experience; a degree in one of the sciences; or the consent of the instructor.

**726. Interpretation of Statistical Calculations**

Year, 2 credits each semester. (Alternate years)

ALEXANDER STURGES

A seminar course to provide an opportunity to reflect on the implications involved in the use of various procedures, not in the details of these procedures, except incidentally. The main problems of statistical methods are discussed, wherever practicable, from the standpoint of philosophical considerations in the belief that, to a sufficient number of students, such considerations are more convincing than mathematical ones, even though these latter make possible more exact developments and, in fact, are fundamentally only more precise statements of the former. The place of statistical methods is presented in terms of a specific theory of knowledge to show why and in what circumstances statistical results should carry conviction. *Prerequisite:* Intermediate Statistics; statistical experience.

**725. Research Methods in Radio Programs**

Spring, 2 credits

GEORGE BARR KING

Intended as a study of audience and program research techniques employed by the broadcasting industry, independent marketing research organizations, and various Government agencies, and as a critical appraisal of these methods. The evaluation will not be on a highly technical statistical level, but will touch on recent developments in statistical research techniques, including emphasis on sampling and regression methods. *Prerequisite:* Economics and statistics, one course each.

**[727.] The Planning of Statistical Surveys**

(1947-48 and alternate years)

A. J. JAFFE

**[729.] Population Statistics****Population Research Methods and Analysis**

(See p. 102)

**[731.] Least Squares and Curve Fitting**

**732. Sampling in Social and Economic Surveys**

Fall, 3 credits

H. NISSELSON

A one-semester course. Applications of the representative method to practical and timely problems. Fallacies of the total count. Accuracy and precision. Problems involved in the selection of a sample. The theory of random sampling. The choice of sampling unit. Subsampling, stratified sampling, purposive selection. The use of intra-class correlation and analysis of variance in the design of sampling techniques. Analysis of cost data. Review of important sampling procedures as used in the United States and foreign countries. *Prerequisite:* Elementary Statistical Analysis; experience in social surveys.

**[733.] Theory of Sampling (1947-48 and alternate years)**

JEROME CORNFIELD and W. D. EVANS

**735. Theory of Sample Surveys**

Year, 2 credits each semester

MORRIS H. HANSEN

WILLIAM N. HURWITZ

History of sampling in social surveys. The use of statistical control in improving the quality and efficiency of the estimates. Calculation of sampling errors. Random, stratified random, purposive, double and systematic sampling. Cost function, choice of sampling unit; size and type of sample necessary to attain a stated degree of precision, and the distinction between precision and accuracy. The theory of probability is developed as necessary. The contributions of Fisher, Neyman, Yates, Cochran, and others are studied. *Prerequisite:* Elementary Statistical Analysis; calculus.

**717. Interview Survey Techniques in the Social Sciences**

Spring, 2 credits

DWIGHT W. CHAPMAN

The basic methods of making interview surveys to obtain accurate data from respondents with regard to their attitudes and opinions, their economic and related behavior, and the information they possess on the problem being studied. Consideration is given also to market research, polls, and other types of surveys. Also included is a study of survey planning, formulation of hypotheses, questionnaire construction, methods of coding, and analysis. *Prerequisite:* A course in general psychology and one in statistics.

**[734.] Statistical Methods for Research Workers****[551.] Sequential Analysis of Statistical Data****738. Introduction to Sampling and Statistical Inference**

Year, 2 credits each semester. (Alternate years)

W. EDWARDS DEMING

A first course in mathematical statistics, intended to give an introduction to sampling and the use of statistical tests in the social sciences, engineering, and other experimental work. Studies in probability; use of the Gamma and Beta functions and other mathematical devices. Theory of errors. Development and meaning of various statistical tests. Errors of the first and second kinds. Theory of estimation; inverse probability; confidence limits and fiducial probability. Analysis of variance and intra-class correlation in sample design. *Prerequisite:* Calculus; first course in statistics; a degree in one of the natural or social sciences.

**739. Multivariate Analysis**

Year, 3 credits each semester. (Alternate years)

M. A. GIRSHICK

Multivariate normal distribution; joint moments of sample variances, and covariances. Sampling from a bivariate normal population. Tests of significance; problems of estimation. Joint distribution of variance and covariance; distribution of the correlation coefficient when the population correlation is and

is not zero. Least squares; classical applications; relation to maximum likelihood. Distribution of the multiple correlation coefficient. Orthogonal polynomials. Factor analysis. Canonical correlation. Non-normal distributions. Applications. *Prerequisite:* Linear algebra; work in intermediate or higher statistics.

**[740.] Analysis of Variance (1947-48 and alternate years)**

M. A. GIRSHICK

**[741.] Theory and Application of the Characteristic Function (1948-49 and every third year)**

COL. SOLOMON KULLBACK and WALTER JACOBS

**745. Seminars in Sampling and Statistical Inference**

Year, non-credit

W. EDWARDS DEMING

Notices regarding meetings are mailed to those who apply for admission. See the special announcement on page 32.

**[749.] Control of Quality by Statistical Methods**

**[750.] Theories of Acceptance Sampling**

M. A. GIRSHICK

**751. Theory of Measure**

Year, 2 credits each semester

JOSEPH F. DALY

For the outline, refer to the courses in mathematics.

**[752.] Advanced Theory of Probability**

(1947-48 and alternate years)

JOSEPH F. DALY

**753. Modern Developments in Statistical Economics**

Year, 2 credits each semester

M. A. GIRSHICK

A seminar in the modern approach to time series and the regression method of solving certain problems in economic relationships. Serial correlation. Description of the various mathematical models involved, and comparison of the proper solutions. Approximate solutions. *Prerequisite:* A first course in mathematical economics; theory of functions; least squares or advanced work in statistics.

# Department of Office Techniques and Operations

## DEPARTMENTAL COMMITTEE

**STROTHER B. HERRELL**, Assistant Director of Personnel, Office of Personnel, USDA  
(Chairman)

**FRANCIS P. BRASSOR**, LL.M., Chief, Administrative Services, Civil Service Commission  
**HAROLD G. CLARK**, Ph.D., Chief, Training Section, Division of Personnel Management, Field Service Branch, Production and Marketing Administration, USDA  
**HENRY A. DONOVAN**, Assistant Chief, Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, USDA

**JOHN S. LUCAS**, Chief, Communications Division, Office of Plant and Operations, USDA  
**PAUL R. PRESTON**, Ph.D., Chief, Division of Service Operations, Field Service Branch, Production and Marketing Administration, USDA  
**LEWIS R. TOLL**, M.S., Business Analyst, Central Printing Office, Office of Price Administration

—O—

*Course Numbers and Symbols*—Below 100, non-credit; 100-399, undergraduate; 400-699, graduate and advanced undergraduate (senior); above 699, graduate. Bracketed numbers, not given this year.

—O—

## CLERICAL-ADMINISTRATIVE PROCEDURES

—O—

### COMMITTEE ON CLERICAL-ADMINISTRATIVE PROCEDURES

**HENRY A. DONOVAN** (Chairman)

**SIDNEY J. ADAMS**, LL.B., Administrative Officer, Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, USDA  
**FRANCIS P. BRASSOR**, LL.M., Chief, Administrative Services, Civil Service Commission  
**WILLIAM A. DEVAUGHAN**, Chief, Procedures and Services Section, Personnel Division, Budget and Management Branch, Production and Marketing Administration, USDA

**LINWOOD E. DONALDSON**, Chief, Records Management Section, Communications Division, Office of Plant and Operations, USDA  
**DWIGHT L. MYERS**, Chief, Bureau Accounting Service, Division of Accounting, Office of Budget and Finance, USDA  
**JAMES SCAMMABORN**, Chief, Division of Purchase, Sales and Traffic, Office of Budget and Finance, USDA

The courses described under Clerical-Administrative Procedures are closely related to those offered in the Department of Public Administration and are an integral part of the program leading to the Certified Statement of Accomplishment in Administrative Procedures (see Department of Public Administration for details). They are practical, how-to-do-it, courses chiefly of interest to persons in grade CAF-7 positions, or below, who are either working with these procedures, or who hope to train themselves for such positions, or positions requiring some familiarity with more than one of these procedural subjects (e.g., administrative assistants and head clerks). High school graduation is a basic requirement for admission in

these courses; exception will be made only on the basis of proven equivalent experience.

—O—

### 108. Administrative Procedure

Fall, 2 credits. Repeated in Spring

THOMAS J. HICKEY

Intended for persons who wish to become supervisors or administrative assistants or who are now serving in such capacity in a small organizational unit. Deals with the "HOW" aspects of the day to day assignments for which these persons ordinarily are responsible, such as preparation of budget data for small organizational units; preparation of recommendations on personnel actions in a typical organization; the maintenance of office records; orientation and assignment of new employees, essential requirements for good supervision.

The second part of this course deals with the introduction to administrative planning, administrative procedures and management generally at the lowest organization level, including work reporting and work measurements, work processes and work control reports; relation of these studies to the budgetary and personnel needs of the unit; and the theory of staff versus operating jurisdiction over administrative planning.

### 208. Advanced Administrative Procedure

Fall, 2 credits. Repeated in Spring

PHILLIP T. THORSON

Intended for persons who are now assigned to administrative assistant and supervisory positions. Deals with (1) the conduct of administrative and procedural surveys and audits directed toward the development of factual data for management purposes; the analysis of these data, the preparation of reports and recommendations thereon; (2) the putting into effect of the approved recommendations through the actual drafting of procedural instructions and the designing and standardization of forms; (3) the installation of approved procedures and the establishment of executive controls to insure compliance with approved instructions; (4) the modern and tested techniques and methods ordinarily used in developing factual data and graphic presentations regarding flow of work, organization structure, work assignments, authority, work duplications, delays and bottlenecks; (5) report writing; (6) the value of illustrated presentations of work processes in eliminating duplication of work, in simplifying operations and in cutting out unnecessary steps; (7) the value of and the need for specific written manuals of instructions as tools of management; and (8) the relation of these instructions to those taught in the other Office Techniques and Operations Courses. *Prerequisite:* Completion of one of the following courses: 108, 110, 112, 114, 115, 116, 117, 210.

### 116. Federal Budgetary Procedure

Fall, 2 credits. Repeated in Spring

KEITH L. HANNA

This course is designed to assist employees either in budget work or preparatory to taking budget work, up to and including Grade CAF-9. It deals with budgetary procedures, including the preparation of estimates, justifications, tabular statements, graphs, etc., and, in connection with budget execution, outlines methods in making allotments, operating budgets, analysis of reports, preparation of apportionment and obligation reports, and other methods used in the formulation and execution of the Federal budget.

### 122. Federal Payroll Procedure

Fall, 2 credits. Repeated in Spring

LOUISE M. KRUEGER and WILLIAM E. MARSHALL

This course deals with the basic principles and procedures relative to paying compensation to Federal employees, including pay computation, deductions,

pay roll preparation with special emphasis on the "Simplified Payrolling Procedure" prescribed by the General Accounting Office, scheduling, processing the voucher, pay roll adjustments, and Decisions of the Comptroller General relating to pay. In addition the course will cover the necessary accounting work involved in individual earnings, retirement, tax, bonds, and other deductions, and reconciliation of records within the pay roll unit and with the general accounting records. It is designed to assist present and future pay roll clerks in understanding the current Federal Employees Pay Act and in operating under the "Simplified Payrolling Procedure."

### 112. Federal Accounting Procedure

Fall, 3 credits. Repeated in Spring

JOHN L. TIERNEY

Designed particularly to train accounting clerks through instruction of employees now working in lower grades and to assist accounting clerks in present and prospective positions. It embraces explanation of, discussion on, and practice work with the basic ledgers (allotment ledger, objective classification ledger, and general ledger) maintained in connection with funds made available to Federal agencies. Appropriation, apportionment, allotment, disbursement, collection, and reporting processes will be discussed and the relationship between administrative accounts and accounts kept by the Treasury Department and the General Accounting Office explained.

### 110. Federal Auditing Procedure

Fall, 2 credits. Repeated in Spring

CAREY G. CRUIKSHANK

This intensive one-semester course is intended for those having no previous knowledge of the subject and is designed to furnish fundamental training for employees now in lower grades as clerks, typists, machine operators, etc., who intend to take the course on Advanced Federal Auditing Procedure or who have opportunities of eventually becoming auditors by serving apprenticeships. It covers explanations of, discussions on and practice work with the two most common types of Government vouchers; deals with, to a limited extent, certain related documents and procedures and should prepare students for higher grades and better-paying positions. The Manual outlines in detail various pertinent procedures.

Embraces general and basic principles; definitions of terms, description and use of standard forms involved, authorizations and allocations; general procedure in auditing standard form 1034 vouchers; suspensions and disallowances, General Accounting Office exceptions and replies; purchase order procedure and its relation to auditing; tax exemption procedure and its effect upon auditing; general procedure in auditing standard form 1012 vouchers; authority for travel, emergency travel per diem allowances, method of computation; methods of travel, duty status and leave, application of statutes, regulations and Decisions of the Comptroller General; exigency statements, special correspondence; and practice audit work on standard form 1034 "purchase" vouchers and standard form 1012 "reimbursement" vouchers.

### 210<sup>a</sup>. Advanced Federal Auditing Procedure—First Half

Fall, 2 credits

JOHN C. COOPER

This advanced two-semester course is intended for those who have taken Federal Auditing Procedure, who already have from training or experience the basic information furnished thereby, or who are now engaged in Federal auditing or related work. It is designed to assist auditors and others with the fundamental knowledge to prepare themselves for more responsible and more remunerative positions. It embraces explanations of and discussions on Federal auditing policy and practice and affords practice work along advanced lines with all types of Government vouchers and related documents. The Manual used outlines in detail various pertinent procedures.

The first semester covers the relationship of auditing to general fiscal control; various types of authorizations and allocations; administrative examination

of fiscal documents; special fiscal correspondence; normal methods of handling suspensions, disallowances, certifications, etc.; unusual problems in the audit of standard form 1034 vouchers; fiscal policies and provisions of formal contracts; the usual fiscal policies and provisions involved in informal agreements; relationship of procurement to auditing and the policies followed in use of purchase orders; tax exemption practices and relation to auditing; transportation of property and personnel, use of transportation requests and bills of lading; audit of transportation vouchers; claims and adjustments; General Accounting Office exceptions, pre-audit and direct settlements; and practice audit work with the voucher forms involved. *Prerequisite:* Federal Auditing Procedure or equivalent experience.

### **210<sup>b</sup>. Advanced Federal Auditing Procedure—Second Half**

Fall, 2 credits

JOHN C. COOPER

The second semester covers unusual problems in the audit of standard form 1012 vouchers; explanatory statements, sub-vouchers; special certifications; authority for travel and policies relating thereto; per diem allowances and computations, and policies respecting rates; duty status and leave of various types; policies regarding methods of travel; application of legislation and regulations; use of Decisions of the Comptroller General; the relation of Comptroller General's decisions to particular cases; advertising and other unusual voucher forms; adjustment vouchers and the accounting tie-in; collections and deposits, auditing receipts; preparation of replies to General Accounting Office exceptions; preparation of memoranda on administrative suspensions and disallowances; and practice work on the standard forms involved. *Prerequisite:* Advanced Federal Auditing Procedure—First Half or equivalent experience.

### **413. Office Management**

Fall, 2 credits. Repeated in Spring

DANIEL M. BRAUM

Designed to give supervisors and administrative assistants familiarity with the fundamental principles and methods needed by them to do a satisfactory management or supervisory job. Deals with the common day to day administrative problems and questions encountered by supervisors such as, (1) determination of space requirements and proper space allocation with due regard to flow of work; (2) the utilization and care of all existing facilities—equipment, labor saving devices, communications, etc.; (3) discussion of the effect of heat, light and ventilation on the morale and output of employees; (4) development and use of management tools in the Federal Government; (5) planning for improvements—how to secure participation by officials, supervisors and employees in suggesting and making improvements; and (6) a treatment of many management aides and devices not specifically covered in other Graduate School courses.

### **114. Federal Personnel Procedure**

Fall, 2 credits. Repeated in Spring

VERNA C. MOHAGEN

Deals with the elementary principles and procedures of Federal personnel administration, including a study of the Federal personnel structure and organization, history and progress of the merit system, rules and regulations of the Civil Service Commission, and other basic procedural sources; use of personnel forms, records and files systems; Civil Service examinations and recruitment; appointments; transfers; promotions; separations, terminations and reductions in force; suspensions and disciplinary actions; retirement; efficiency ratings; leave and hours of duty; personnel reports, applications of Decisions of the Comptroller General, administrative policy statements, and administrative orders.

### **214. Advanced Federal Personnel Procedure**

Fall, 2 credits. Repeated in Spring

VERNA C. MOHAGEN

Similar to Federal Personnel Procedure but more thorough in its treatment of the subject. Deals with advanced principles and techniques in Federal

personnel procedures and their relation to operating programs, including a study of the principles of the Civil Service Act, Rules and Regulations, and their application to day-to-day problems in a Federal personnel office; recruiting sources for Civil Service examinations and appointments; study of promotion-from-within procedures; reduction-in-force procedures, and their application to specific operating situations; policies and their procedures for the handling of veterans' problems including placement of returning veterans; study of procedures for systematic retirement of employees reaching annuity age; procedures for investigation and enforcement of discipline; periodic reports and their use for operating purposes; procedure and policy statements in the general field of personnel administration; procedural source materials such as the Civil Service Commission, Federal Personnel Manual, Decisions of the Comptroller General, Executive Orders, etc., and applying them to detailed operating procedures; relationship of the personnel office to budget, accounting, payrolling, and other staff functions. *Prerequisite:* Federal Personnel Procedure or equivalent practical experience in a Federal personnel office at Grade CAF-4 or above.

### 115. Federal Purchasing Procedure

Fall, 2 credits

JAMES SCAMMAHORN

Elementary principles and ethics of Federal purchasing in general and its relation to operating programs; historical background; organization for purchasing; purchasing and contracting authority; basic practices and procedures with legal and administrative background; use and preparation of requisition, purchase order, bid, bill of lading; voucher and other procurement forms; sources of supply such as General Supply Schedules, Government warehouses, Prison industries, Blind-made Products; War Assets Administration, commercial market, and how to use such sources; open market and bid purchases; leasing of space; preparation, inviting and award of bids, including fundamentals of writing specifications; advertisements in publications; formal contracts, including source of supply contracts, and bid and performance bonds; inspection of deliveries for compliance with specifications.

### 215. Advanced Federal Purchasing Procedure

Spring, 2 credits

JAMES SCAMMAHORN

Standard Federal Specifications, what they are and how to use them; warehousing, storage and issue; property accountability and relation of purchasing to utilization and property management; traffic and transportation rules and procedures to be followed in making shipments of supplies and equipment and employees' household goods; disposition and sale of surplus personal and real property under Surplus Property Act of 1944; use of U. S. Standard Commodity Classification and Handbook of Description of Property; exchange of property; excise taxes; procurement of special items; laws, Decisions of the Comptroller General and regulations affecting procurement; and relationship between the service and supply and related service functions such as accounting, fiscal and budgetary processes. *Prerequisite:* Federal Purchasing Procedure.

### Management of Governmental Purchasing

(See p. 76)

### Property Management

(See p. 76)

### 117. Records Management Procedure

Fall, 2 credits

L. E. DONALDSON, C. T. SMITH and Lecturers

Instruction in basic practices and procedures for maintaining and servicing government records including mail and messenger service. Includes detailed instructions and actual practice in methods of recording communications, and classifying, coding, indexing and filing correspondence and other documents. Designed for students who desire to enter this field or who are interested in supplementing their knowledge of the mechanics of record keeping.

**217. Advanced Records Management**

Spring, 2 credits

L. E. DONALDSON, C. T. SMITH and Lecturers

Designed to give the student a comprehensive knowledge of the management of government records. Principles of good records management; the organization and functions of records offices; planning and simplifying procedures; work flow; space arrangement; and system selection and installation. Also includes a discussion of laws and regulations governing preservation and disposal of records, appraisal, systematic retirement, storage, disposal and microphotography. *Prerequisite:* Records Management Procedure or equivalent or consent of instructor.

**Administrative Operations for Congressional Assistants**

(See p. 67)

**Government Letter, Report and Related Writing**

COMMITTEE ON LETTER, REPORT AND RELATED WRITING

HAROLD G. CLARK (Chairman)

CLIFFORD R. BARNES, Administrative Analyst, Division of Fiscal Management, Office of Budget and Finance, USDA  
 DONALD R. ELLIS, Assistant Chief, Budgetary Reporting and Statistics Section, Division of Estimates and Allotments, Office of Budget and Finance, USDA  
 MAX FREYD, Ph.D., Chief, Instructions and Manuals Staff, Civil Service Commission

JAMES H. HARD, Chief Administrative Analyst, Bureau of the Budget  
 WARREN B. IRONS, Chief, Retirement Division, Civil Service Commission  
 CHARLES H. NIEMANN, B.B.A., Chief, Correspondence Management Section, Administrative Management Service, Veterans Administration  
 CHARLES R. PECK, B.A., Head, Administrative Services Branch, Office of Industrial Relations, Navy Department

**118. Practical English Usage**

Fall, 2 credits. Repeated in Spring

CHARLOTTE L. WHITE

This course enables students through practice to master the fundamentals of correct English. Troublesome problems of English usage, sentence structure, choice of words, style, and grammar, are studied as aids to clear and forceful writing of letters, memoranda, and reports.

**Descriptive English Grammar**

(See p. 22)

**119. Vocabulary Building**

Fall, 2 credits. Repeated in Spring

MARIE BRYAN

Designed to help writers and speakers express ideas clearly and attractively. It embraces word study and selection, diacritical markings, synonyms and antonyms, prefixes and suffixes, usage exercises, and other means of developing a broad and useful command of words.

**[220.] Principles of Writing****120. Government Letter Writing**

Fall, 2 credits. Repeated in Spring

VERNE L. SAMSON

The writing of clear, accurate, concise, courteous letters and memoranda contributes to efficiency and economy in administration. This course gives the student (1) opportunity to work out the principles of effective letter writing; (2) practice in criticizing and revising outgoing correspondence, and in planning and drafting replies to incoming letters; and (3) drill in the fundamentals of good writing.

**341. Systematic Coordination of Management Directives**

Fall, 2 credits

EARL P. YOCUM

A course in the most effective devices for the design, formulation, coordination, control, production and distribution of management directives within an organization. The place of effective communication in the management process and the establishment of responsibility and authority for issuing instructions. Various systems of identifying, codifying, amending or revising issuances from topside sources; the fixing of responsibility for coordinating policy and procedural instructions; and the use of basic source materials.

The objective of this course is to indicate the most practical methods of facilitating communication as the essence of command, to outline the criteria for adapting the system of communication to the organization, and to provide the techniques for writing, preparation, clearance, and maintenance of administrative instructions and regulations.

**Writing for Official Purposes**

(See p. 23)

**Reporting to Top Management**

(See p. 67)

**OFFICE MACHINE OPERATION****Machine Tabulation**

(See p. 38)

**Advanced Study of Tabulating Equipment**

(See p. 38)

**SECRETARIAL PRACTICES**

ROBERT L. HILL (Chairman)

**325. Secretarial Practices**

Fall, 2 credits

MILDRED R. STEPHENS

A course designed for Government employees whose work is, or is closely related to, that of a stenographer or secretary. The purpose is to develop an understanding of what constitutes a successful job through discussion and illustration of (1) need for fundamental facts about the agency and its relationships to other agencies and the public; (2) employee's part in the agency program; (3) skills needed to perform work; (4) familiarity with available services, sources of information and other reference materials; (5) relationships with other employees. *Prerequisite:* High school graduation and background training or experience as a stenographer or secretary.

**SHORTHAND**

These courses are designed to furnish Federal employees an opportunity to follow a program of training for stenographic careers in the Federal service. While each course represents a separate unit of study, with emphasis on material used in the Federal service, a proper sequence of courses insures a sound foundation for successfully qualifying for the various grades and classifications of stenographers in the Federal service.

"Review of Gregg" will serve as rapid review for the student who has not applied his shorthand knowledge for a long time, or has used it so little that he feels uncertain about applying his knowledge to practical office dictation. Students finishing the be-

ginning shorthand class may continue with the intermediate and then the "Gregg, 70 to 100 Words." Because the "Gregg, 100 to 130 Words" course is an intensive course on technical material, students should have a sound foundation in theory and be able to write 100 words a minute with a 95 percent accurate transcript before registering for the course. Home study is required to attain goals set in course descriptions. Amount of study required varies according to the learning habits and individual goals of students.

As a general guide to assist employees who wish to plan a course of study to build for a stenographic or stenographic-reporting career in the Federal service the following parallels are drawn:

<i>Course</i>	<i>Goal</i>	<i>Prerequisites</i>
I. Beginning Gregg	Knowledge of theory, with writing ability of 80 words a minute on familiar material	For those who have not studied shorthand, or for those who have some knowledge of shorthand but have not completed a theory course
II. Intermediate Gregg, Gregg, 70 to 100 words	Theory review; 80 to 100 words a minute on new, standard material	For those who have completed a course in I or an equivalent theory course
III. Gregg, 100 to 130 words	Ability to take difficult dictation at rapid rate; to record full secretarial report of conferences; and to record telephone conversations	For those who have completed a course in I and II or equivalent theory and dictation courses, and who have a minimum speed of 100 words on new, standard material
IV. Gregg, 140 to 200 words	Recording of conferences, hearings, 50 percent verbatim (or more); beginning reporting	For those who have qualified on 140 standard word test
V. Gregg, 160 words and up	Verbatim reporting	For those who have qualified on 175 word standard test or 160 word test plus additional experience and training

## 89. Review of Gregg Shorthand

Fall, non-credit. Repeated in Spring

NAOMI H. EVANS

A review of theory and brief forms. Reading from shorthand plates and students' own notes; dictation of standard material at various progressive rates of speed. *Prerequisite:* Completion of the Gregg Manual or its equivalent by the functional system.

## 129. Beginning Gregg

Fall, 3 credits. Repeated in Spring

ANNA C. BOLTON

## 130. Intermediate Gregg

Fall, 3 credits. Repeated in Spring

CLARA RICHTER

**230. Gregg, 70 to 100 Words**

Fall, 2 credits. Repeated in Spring

ALICE COFFMAN

**231. Gregg, 100 to 130 Words**

Fall, 2 credits. Repeated in Spring

LEWIS TOLL

**335. Reporting—Gregg, 140 to 200 Words**

Fall, 4 credits

BERNARD P. FOOTE

**336. Advanced Reporting—Gregg, 160 Words and Up**

Spring, 4 credits

BERNARD P. FOOTE

**338. Shorthand in Spanish**

Fall, 2 credits

SOFIA KRISSILLAS

An elementary course covering basic principles and outlines of Spanish Gregg Shorthand Manual and progressive dictation in Spanish through supplemental exercises and business correspondence; emphasis on accuracy. *Prerequisite:* Knowledge of Spanish.

**339. Advanced Shorthand in Spanish**

Spring, 2 credits

SOFIA KRISSILLAS

Dictation of business letters and commercial articles on Latin American subjects; reading of notes; incidental review of Spanish Gregg Shorthand Manual. *Prerequisite:* Course 338 or equivalent.

## Department of Physical Sciences

### DEPARTMENTAL COMMITTEE

**HENRY STEVENS**, Ph.D., In Charge, Chemical Investigations of Allergens in Agricultural Products, Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, USDA (Chairman)

**CAPT. R. D. BENNETT**, Ph.D., Technical Director, Naval Ordnance Laboratory, U. S. Naval Gun Factory

**ELSA ORENT KEILES**, D.Sc., Principal Nutrition Chemist, Bureau of Human Nutrition and Home Economics, Agricultural Research Administration, USDA

**CHARLES E. KELLOGG**, Ph.D., Chief, Division of Soil Survey, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, USDA

**W. W. RUBEY**, A.B., Staff Geologist, U. S. Geological Survey, Department of Interior

**CHARLES F. SARLE**, Ph.D., Executive Assistant, Scientific Services, U. S. Weather Bureau, Department of Commerce

**L. B. TUCKERMAN**, Ph.D., Assistant Chief, Division of Mechanics and Sound, National Bureau of Standards, Department of Commerce

—O—

*Course Numbers and Symbols*—Below 100, non-credit; 100-399, undergraduate; 400-699, graduate and advanced undergraduate (senior); above 699, graduate. Bracketed numbers, not given this year.

—O—

### ENCOURAGING FURTHER TRAINING OF SCIENTIFIC PERSONNEL

Recently an interdepartmental Advisory Committee on Scientific Personnel was established to advise the Civil Service Commission regarding methods of facilitating the selection, training, advancement, retention, and recognition of superior performance of scientific and technical personnel in the physical and biological scientific work of the Federal government.

The Advisory Committee on Scientific Personnel has recommended that a study be made to determine the educational needs of scientific workers in all agencies of Government and that action be taken to meet these needs. It is planned that a summary of courses in the Biological and Physical Sciences offered by universities in the Washington area will be prepared and distributed by the Advisory Committee on Scientific Personnel about September 1, 1946.

### GENERAL

#### Patent Law for Executive and Scientific Personnel

(See p. 114)

#### Reporting to Top Management

(See p. 67)

#### Writing for Official Purposes

(See p. 23)

<b>Psychology of Human Relations</b>	(See p. 99)
<b>Effective Meetings</b>	(See p. 24)
<b>Advanced Public Speaking</b>	(See p. 24)

### CHEMISTRY

#### **147. General (Inorganic) Chemistry**

Year, 2 credits each semester

ROSCOE H. CARTER

Refresher course designed for students who desire a general knowledge of the subject and those who wish to bring their knowledge up to date. Aim of the course is to give students a better comprehension of the chemical aspects of our environment. The course consists of a series of lectures covering the concepts, principles, facts, and applications of general chemistry. Some organic chemistry is included. No individual laboratory work.

#### **248. Organic Chemistry**

Year, 2 credits each semester

C. VERNE BOWEN

Fundamental principles of general organic chemistry are reviewed. Such topics as classification, nomenclature, type reactions, and structure will be considered. Historically important discoveries are correlated with the development of the subject, and emphasis is placed upon the treatment of compounds or classes of compounds that are industrially, medically, or biologically important. The first semester is devoted to consideration of the aliphatic series; the second semester to the aromatic and heterocyclic series. Recent progress in the chemistry of sterols and vitamins is given. *Prerequisite:* One year general chemistry.

#### **349. Physical Chemistry**

Year, 2 credits each semester

WALTER J. HAMER

Lecture course on the fundamental laws of chemical reactions. Correlations between molecular structure and physical and chemical properties of matter are considered. The principles of thermodynamics, thermochemistry, chemical equilibrium, and chemical activation are discussed. Other topics include the phase rule, eutectic mixtures, and cooling curves; colloids; adsorption; solutions; ionization and electrolytic conductance; electrode potentials; speed of reactions; effects of radiation on chemical reactions; industrial distillation problems; isotopes; and radioactivity and transmutation of the elements. *Prerequisite:* One year general chemistry; calculus; or permission of the instructor.

#### **522. Physiological Chemistry**

Year, 2 credits each semester

CARTER D. JOHNSTON

Lecture course on principles of biochemistry. It deals with the chemistry of proteins, fats, and carbohydrates, general chemical composition of animal tissues, e.g., muscle, nerve, milk, and blood; brief discussion of enzymes of the gastro-intestinal tract; digestion and absorption of principal foodstuffs; metabolism of proteins, fats, and carbohydrates; mineral metabolism; chemical constituents of urine; and general discussion of the chemistry and physiology of the vitamins and hormones concludes the course. *Prerequisite:* One year general chemistry; one year organic.

#### **532. Geochemistry**

Year, 2 credits each semester

HARDEE CHAMBLISS

After a brief review of pertinent principles of geology, physics and chemistry, the discussion will be primarily concerned with universal matter: the composition of the sun, of other stars, of other planets than our own, and of the crust of the earth.

Evidence will be presented concerning the composition of the core of the earth, the general character of the rocks as we pass outward from the core to the surface and the mineralogical composition of these rocks. Then will follow such topics as the internal heat of the earth, vulcanism and lavas, gases in rocks, the waters of the earth, the atmosphere and the (weathering) effects of these two agents on rocks to produce soils.

During the second semester the work will be more advanced in that the application of elementary physical chemistry to such problems as magmatic differentiation, the migration of underground materials, the genesis of ore deposits, metasomatism, accumulations of coal, of gas and of oil, will be taken up. The economic aspects of such deposits and accumulations will receive attention as will also the applications not only of geochemistry but also, to a limited extent, of geophysics to underground exploration for oil, etc. *Prerequisite:* At least one year of college chemistry plus a year of college physics or geology, preferably both.

### [350.] Food Technology

#### 762. Electrochemistry

Year, 2 credits each semester

WALTER J. HAMER

Lecture course on fundamentals of electrochemistry. It deals first with the laws of electrolysis, coulometers, electrolytic conductance, ionic migration, and transference numbers. Discussions are included of ionic equilibria, ionization constants, determinations of pH or hydrogen-ion activity, and potentiometric and conductometric titration. These are followed by studies of the mechanism of electrode processes, galvanic cells, oxidation-reduction potentials, passivity and overvoltage of electrodes, electrode polarization, the polarograph, and electrophoresis. The course concludes with brief discussions of electrical properties of plastic solids; characteristics of dry cells, storage batteries, and rectifiers; and the factors involved in electrorefining, galvanic corrosion, and electroplating. *Prerequisite:* Physical chemistry or permission of the instructor.

**Progress in the Field of Antibiotics** (See p. 18)

**Advances in Insecticides and Fungicides** (See p. 18)

**Recent Advances in Animal and Human Nutrition** (See p. 19)

**Chemistry of Photography** (See p. 119)

**Glass Blowing** (See p. 118)

#### COMMITTEE ON EARTH SCIENCES

S. W. BOGGS, Special Consultant on Geography, Department of State (Chairman)

ROLLIN S. ATWOOD, Ph.D., Assistant Chief, Division of International and Functional Intelligence, Department of State

W. H. BRADLEY, Ph.D., Chief Geologist, Geologic Branch, U. S. Geological Survey, Department of Interior

CARLETON P. BARNES, Ph.D., Chief Analyst, Soil Uses and Productivity, Division of Soil Survey, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, USDA

CHARLES E. KELLOGG

W. W. RUBEY

CHARLES F. SARLE

—O—

It is recognized that there are unusual facilities in the Washington area for study and research in the earth sciences. To make most effective use of these facilities in the interest of advanced edu-

cation and research the Committee on Earth Sciences proposed that the Graduate School enlist the cooperation of representatives from some of the major universities offering extensive work in these fields and from related professional associations such as the Division of Geology and Geography of the National Research Council. This activity probably will result in the organization of additional courses in the Earth Sciences and will be reflected in later announcements of the Graduate School.

—O—

## GEOGRAPHY AND GEOLOGY

### 451. Geography of the Pacific Islands

Spring, 2 credits

F. RAYMOND FOSBERG

A brief introduction to the physical and economic geography of the Pacific area. Discussion will include the origin, geological history, and present geological features of the Pacific basin; the climate and vegetation; the historical sequence of peoples in the region in light of geography; economic geography by regions, including the eastern Pacific, Polynesia, Micronesia, Melanesia, Australia, Malaysia, Japan and the northwestern Pacific; the impact of European civilization on the Pacific, and its results. A fundamental purpose of the course will be to give a basis for an understanding of developments in the Pacific.

### 455. Geomorphology of the United States

Fall, 3 credits

HOWARD A. MEYERHOFF

A survey of the geomorphic provinces and sections of the United States and contiguous areas in Canada and Mexico. The work of the course will involve lectures, readings and map studies with special emphasis on the geologic foundations of land forms. *Prerequisite:* Courses in physical and historical geology.

**The Cultural Regions of the United States** (See p. 103)

**Seminar in Policy Problems in Resource Utilization, Development and Conservation** (See p. 92)

**World Agriculture** (See p. 97)

**Cartography** (See p. 116)

## SOIL SCIENCES

### 156. Soil Conservation

Fall, 2 credits

J. GORDON STEELE

The soil as a resource and why we need to conserve it. Brief review of physical features and land use in the United States as they affect soil conservation. Properties of soil and water. Erosion processes. Farm conservation plans, including the land inventory and the choice and application of conservation practices on the farm. Community action through soil conservation districts. Estimates of the conservation job.

A knowledge of farming, and some previous training in earth sciences, biology or other related subjects are desirable but not essential. Outside readings and reports will be assigned according to the interests and background of the students.

**157. Soil Fertility**

Fall, 3 credits

J. K. ABLEITER

Factors that determine the fertility of the soil and its response to fertilization, liming, green manuring, and other practices are developed. Attention is given to the determination of fertilizer needs and the use of fertilizers in relation to soil conditions, crops grown, and the development of a management system on the individual farm. The properties and use of commercial fertilizer materials and mixtures are discussed.

**531. Soils: Their Morphology, Genesis, and Classification**

Spring, 3 credits

CHARLES E. KELLOGG

The nature of soils and the broad principles governing their behavior are first discussed, followed by consideration of soil morphology, formation, and classification. Particular attention is given to characteristics of the great soil groups and their genesis in relationship to the physical and biological forces of the environment. Soil geography of the United States is dealt with broadly, but some examples from other parts of the world are used. Throughout the course, relationships of soil characteristics to agricultural development, soil use and conservation, and patterns of human occupancy are emphasized. *Prerequisite:* Freshman chemistry or its equivalent. Previous or collateral reading in plant physiology, geology, geography, and logic would be helpful, but not essential.

**[767.] Seminar: Soils and Planning****Current Policy Problems of American Agriculture**

(See p. 91)

**Soil Mechanics**

(See p. 111)

**Ground-water Hydraulics**

(See p. 111)

**METALLURGY****452. Principles of Physical Metallurgy**

Fall, 2 credits

BLAKE M. LORING

Development, meaning, and use of equilibrium diagrams for binary alloys. Iron-carbon diagrams and their relation to cast iron and steel, and to the critical points important in heat-treating ferrous alloys. Steel-treating processes depending on non-equilibrium conditions, including the S-curve. Alloy steels. Aging and precipitation hardening. Segregation and other ingot defects. Mechanical and physical tests, including the interpretation of micrographs. Non-ferrous alloys of industrial importance. *Prerequisite:* College chemistry and physics.

**526. Advanced Physical Metallurgy**

Spring, 2 credits

BLAKE M. LORING

Basic concepts of the physics of metals are discussed in order to develop a better understanding of the common mechanical tests and manufacturing processes. Topics include: definition of a metal; introduction to the crystalline nature of matter; classification of metallic elements according to crystalline structure; relationship between crystalline structure and physical properties; the equilibrium diagram and its relation to physical properties and crystalline structure; introduction to X-ray metallography with calculations from diffraction patterns of metals (illustrated); X-ray evidence of cold working and recrystallization; interval stresses in metals; plastic deformation; theory of metal hardening, ferrous and non-ferrous; diffusion and diffusion processes.

**527. Experimental Techniques in Physical Metallurgy**

Year, 2 credits each semester

BLAKE M. LORING

Introduction to experimental physical metallurgy with emphasis on the precision measurements used in the determination of equilibrium diagrams. Topics include: pyrometry, dilatometry, X-ray metallography, interpretation of microstructure, electrical and thermal conductivity. To be given at the Naval Research Laboratory and is primarily for employees of the Navy Department. *Prerequisite:* Must have qualifications for a Grade P-2 Metallurgist or Physicist.

**METEOROLOGY**

With the growing importance of aircraft operations in military and civilian activities, meteorology is undergoing a rapid expansion. Before proceeding on his flight, the pilot must consult the meteorologist regarding upper-air winds, cloud ceiling, threat of icing and thunderstorms, etc., along his route. Interest in meteorology has increased greatly recently and it is expected that the study of meteorology will assume greater importance in the future.

The course in Principles of Meteorology is intended for persons who desire a general outlook in meteorology and who are not interested in becoming professional meteorologists. The remaining courses are intended to give a fundamental and comprehensive meteorological background for persons interested in pursuing a career in meteorology or related fields.

A course in Introductory College Physics is offered for those who need it as a foundation for study in meteorology (see Physics 153).

**162. Principles of Meteorology**

Fall, 3 credits. Repeated in Spring

CHARLES B. JOHNSON

A course of a descriptive nature explaining the principles of meteorology essentially on a non-mathematical basis. Especially adapted to preparation for sub-professional employment in the Government and to obtaining the basic meteorological knowledge required of a civilian pilot.

**533. Hydrology**

Year, 3 credits each semester

RAY K. LINSLEY

A two-semester course in basic and applied hydrology at the professional level. The first semester will be largely descriptive, covering such topics as elementary hydraulics; measurement and interpretation of streamflow, precipitation and other basic data; the hydrologic cycle; physics of soil moisture; the infiltration theory; wave travel and the unit hydrograph. The second semester will cover the development and application of procedures for applying basic hydrology to practical problems of river forecasting and design of water control works including such subjects as streamflow routing, flood frequency, the rational method of estimating flood magnitude, hydrometeorology, forecasting of runoff, influence of water control structures on streamflow, and problems of water control operation. *Prerequisite:* Physics and algebra; elementary meteorology, statistics, and engineering desirable.

**[534.] Introduction to Dynamic Meteorology**

**536. Physical and Synoptic Meteorology**

Year, 3 credits each semester

ALEXANDER L. SHANDS

A two-semester course in the fundamentals of modern meteorology for the professionally interested student. The first semester stresses the physical aspects—atmospheric composition and structure and their measurement; gas laws; adiabatic, pseudo-adiabatic, and non-adiabatic processes; thunderstorms; fog; wind. The second semester stresses synoptic features—general and local circulations, air masses, fronts, cyclones and anticyclones, upper-air charts, forecasting. Problems involving basic units and graphic manipulations will be assigned. *Prerequisite:* Physics and algebra; trigonometry and elementary meteorology desirable.

**350. Physics of the Upper Atmosphere**

Spring, 2 credits

MARTIN A. GARSTENS

This course will include a discussion of such topics as: distribution of meteorological elements, ionization of the upper atmosphere, propagation of electromagnetic waves, light of the night sky, the aurora, ozone, anomalous propagation of sound, meteors, optical phenomena, cosmic rays, and diurnal variation of terrestrial magnetism.

The course will be of interest to those who are investigating the physics of the upper atmosphere, including meteorologists and those engaged in problems of electromagnetic propagation. *Prerequisite:* College physics.

<b>Aerodynamics</b>	(See p. 111)
<b>Air Transportation</b>	(See p. 105)
<b>World Communication and Transport</b>	(See p. 98)
<b>Advanced Aerial Photogrammetry</b>	(See p. 116)
<b>Design and Analysis of Complex Experiments</b>	(See p. 39)

**PHYSICS****153. Introductory College Physics**

Year, 4 credits each semester

WILLIAM A. KILGORE

This course is intended for those having no previous knowledge of the subject, and for those who wish to review the elements. The class meets in the well-equipped laboratory of Wilson Teachers College.

*First semester:* Mechanics—heat—sound.

*Second semester:* Electricity—light—electronics.

**[530.] Introduction to Hydrodynamics**

MARTIN A. GARSTENS

<b>Applications in Engineering Mathematics</b>	(See p. 36)
<b>Economics of Clothing and Textiles</b>	(See p. 88)
<b>Principles of Air Conditioning</b>	(See p. 109)

**NATIONAL BUREAU OF STANDARDS EDUCATIONAL COURSES**

The Educational Committee of the National Bureau of Standards has developed a series of three courses (700, 701, and 702) to

provide graduate training in physics. The courses are of graduate grade and are recognized by many of the leading universities in granting credit for advanced degrees. Although these courses are planned primarily for members of the staff of the National Bureau of Standards and are given at the laboratories of the Bureau, other qualified students may enroll. These courses are carried as a part of the Graduate School curriculum; registration for Graduate School credit must be made through the School office. Persons who enroll must receive prior clearance for admission to the Bureau of Standards grounds which are still subject to military restrictions. Persons outside the National Bureau of Standards wishing to enroll may secure additional information from the Graduate School.

**700. Advanced Optics (every three years)**

Year, 2 credits each semester. (Special fee, \$20 for year) C. C. KIESS

Topics discussed will be the electromagnetic theory of light and its explanation of the optical properties of materials; laws of radiation and origin of the quantum theory; fundamentals of geometrical optics. References: Theory of Optics, by Drude; Physical Optics, by Wood; and Fundamentals of Physical Optics, by Jenkins and White. *Prerequisite:* Two years of college physics and calculus.

[701.] **Theoretical Mechanics (1947-48 and every third year)**

[702.] **Electricity and Magnetism (1948-49 and every third year)**

# Department of Public Administration

## DEPARTMENTAL COMMITTEE

WILLIAM G. FINN, M.S., Special Assistant to the Director, Office of Requirements and Allocations, Production and Marketing Administration, USDA (Chairman)

GLADYS L. BAKER, Ph.D., Agricultural Historian, Bureau of Agricultural Economics, USDA

H. DEAN COCHRAN, D.Sc., Chief, Division of Personnel Management, Forest Service, USDA

EARL W. LOVERIDGE, B.S.F., Assistant Chief, Forest Service, USDA

WILLIAM A. MINOR, B.S.A., Assistant to the Secretary of Agriculture, USDA

HARLOW S. PERSON, Ph.D., Consulting Economist, Office of the Administrator, Rural Electrification Administration, USDA

DONALD C. STONE, M.A., Assistant Director, In Charge of Administrative Management, Bureau of the Budget

JOHN THURSTON, Ph.D., Secretary, Administrative Council, USDA

## OPPORTUNITIES FOR STUDY AND WORK

The importance of public administration is apparent in the modern state with its emphasis on services, control, operation, and collective action in the public interest. The more the public service is called upon to assume functions previously exercised by individuals or private enterprise the greater the importance of the principles and techniques of public administration. Management problems raised by the war illustrate the critical need for more and better training in public administration, particularly in the junior and assistant positions, even in normal times. The increasing delegation of discretion to administrative agencies has raised unprecedented problems of organization, public consent, and administrative responsibility.

Washington is of necessity the national focal point of all these developments. Many of the ablest and most experienced public administrators are assembled in Washington. Many of the most competent practitioners of the various specialized branches of administration are likewise concentrated in Washington. Utilizing this unique environment and this unexcelled talent, the Graduate School offers courses geared to demonstrated needs and taught by experienced administrative personnel.

## SUGGESTIONS FOR PROGRAM OF STUDY

The following courses cover a wide range of approaches for varying levels of responsibility. Some give background and attitude, and some give methods and skill. Some have their objectives high and broad for perspective and knowledge of relationships; some have their objectives comparatively narrow and sharply focused for skill and ability to perform particular tasks. It is hoped that students will select those courses which supplement and complement

their work assignments rather than concentrate exclusively on more intensive training in the performance of daily tasks.

*General Administration.* Persons who have not had such a course, or varied administrative experience, should begin with Introduction to Public Administration. This course and other basic work should precede courses in special branches of administration (e.g., personnel or financial administration) in order that such courses may be of maximum usefulness.

*Personnel Administration.* Unless substantial experience can be substituted, the general course, Personnel Administration, should be taken before the specialized courses (such as Position Classification, Selection and Placement, etc.). Persons who are in positions classified as Grade CAF-5 or below and desire to prepare for personnel work should take Federal Personnel Procedure; they should not attempt to take the specialized courses until they have gained substantial experience in personnel work or have carefully laid a foundation by completing all basic, general courses.

*Financial and Budgetary Administration and Procurement and Property Management.* Students interested in financial administration can begin with Federal Budgetary Procedure, continue with Financial Organization and Procedures of the Federal Government, then take Budget Formulation followed by Budget Execution. In purchasing, students qualified to work toward the program for a Certified Statement of Accomplishment in Public Administration should take Management of Governmental Purchasing. It is desirable for other students to take Federal Purchasing Procedure first.

*Accounting and Auditing.* Students in classification grades below CAF-5 will find it advantageous to begin with Federal Accounting Procedure or Federal Auditing Procedure. Preparation for higher-level accounting should begin with a year's study of Principles of Accounting, after the completion of which Federal Government Accounting may be taken. Second Year Accounting, Cost Accounting, Auditing, Federal Tax Accounting, Advanced Accounting Problems, and Analysis and Interpretation of Financial Statements provide advanced training for those who desire to progress further with a general accountancy program. (See program below for Certified Statement of Accomplishment.)

#### CERTIFIED STATEMENTS OF ACCOMPLISHMENT

Certified Statements of Accomplishment serve as a certification that the student has completed a well-rounded course of study preparatory for effective public service in (1) administrative procedures, (2) public administration, or (3) accounting. (Also see p. 11.)

Certified Statements of Accomplishment are offered in the three fields described below.

## I. PUBLIC ADMINISTRATION

### *Approach*

Broad-gauge, essentially long-range approach to develop leadership, perspective, broad outlook, and understanding of the human factors in administration; emphasis on principles, with opportunity for study of some techniques in relation to policy.

### *Objectives*

Ultimately, for policy formulation, improvement of administrative machinery, coordination of operations, and general management and control of large units. Immediately, for initial investigations as a junior member of a staff having the responsibilities named above, for assumption of increasingly difficult and more responsible assignments in these fields, and for supervision and management of small units.

### *Requirements*

1. Bachelor's degree or equivalent. (Note: The degree requirement may be waived in the case of well-qualified students who have received a Certified Statement of Accomplishment in Administrative Procedures.)
2. Twenty-four semester hours of credit in Graduate School courses offered in the Department of Public Administration, excluding all accounting courses except Federal Government Accounting. The 24 credit hours are to be distributed as follows:
  - a. A minimum of four credits from the Division of General Administration.
  - b. A minimum of two credits from the Division of Organization and Procedure Analysis.
  - c. The remaining eighteen credits may be selected from the Divisions of Financial and Budgetary Administration, Personnel Administration, Legal Administration, Procurement and Property Management, Government-Public Relationships or additional courses in *a* or *b* above.

Upon approval, courses outside the Department of Public Administration may be taken where they are properly in line with the student's major interest.

The program leading to a Certified Statement of Accomplishment in Public Administration should be of special interest to:

1. Persons already employed in responsible administrative positions. Included in this group are many with specialized training who have been transferred to administrative positions from professional positions without training or previous experience in administration.
2. Junior Administrative Assistants and junior administrative technicians of all kinds.
3. Recently recruited Junior Professional Assistants. Those who entered the service with a public administration option may profit from courses both more advanced and more specialized than those taken in college. Those who entered on various professional options and are now employed in such professions can profit very greatly from these courses if they expect, or wish to prepare, to enter into administrative work connected with their professional fields.
4. Employees who wish to broaden their understanding and improve their efficiency through a "tour of duty" by study, in lieu of an actual tour of duty for which they have found no opportunity.
5. Employees with college background who aspire to transfer to a career in administrative management.

## II. ADMINISTRATIVE PROCEDURES

### *Approach*

Emphasis on techniques, procedures, methods, but with an attempt to understand and use these means in terms of administrative ends or objectives.

### *Objectives*

Ultimately, for responsible conduct of important "housekeeping" operations of specialized character, direction of small units, performance of most difficult and responsible tasks in the procedural aspects of administration, and the settlement of questions of intermediate importance arising out of current or contemplated operations and not covered by existing regulations or decisions.

Immediately, for effective service in some administrative procedure at the clerical or semi-clerical level, as a means of entrance into the line of promotion leading to the responsibilities named above. (Students already at this level may arrange programs in conformity with their needs.)

### *Requirements*

1. High-school diploma or equivalent.
2. Sixteen semester hours of credit selected from the following Graduate School courses:

- a. A minimum of eight credits must be selected from courses offered in the Department of Public Administration (excluding all accounting courses except Federal Government Accounting).
- b. For the remaining eight credits the student may select from the following in the Department of Office Techniques and Operations:
  1. From all courses offered in the field of Clerical-Administrative Procedures.
  2. Government Letter Writing or Systematic Coordination of Management Directives.
- c. A course in elementary statistics (not exceeding three credits) may be included. It is not required. If it is included, three credits may be deducted from b above.

The program leading to a Certified Statement of Accomplishment in Administrative Procedures should be of special interest to:

- 1. Persons already employed in administrative work of the procedural type, emphasizing techniques and skills.
- 2. Employees who aspire to enter administrative work but who, because of lack of college education, find their opportunities in that field greatly limited except at the procedural level. This program of courses is useful for persons with good native ability but limited educational background, because it prepares them for a level of work most likely to be open to them. After they have succeeded in getting into administrative work, perhaps even at the clerical-administrative level, they can then combine their work-experience and study-experience to mutual advantage as progress is made toward greater responsibility. This approach is believed to be better for such persons than the common practice of attempting to circumvent the usual educational requirements by shortcut concentration on advanced and specialized courses, which are actually preparatory for responsible positions only insofar as they *supplement* broader educational background.
- 3. Employees who wish to prepare to become Junior Administrative Assistants or to head units concerned with administrative procedures.

### III. ACCOUNTING

The Graduate School is interested in offering accounting courses primarily as a means of training for the *public* service.

The curriculum necessarily includes courses in general accounting because the basic principles are essential for government accounting. The scope of accounting in the Federal service is wide.

There are increasing demands for accountants having a knowledge of commercial as well as government accounting. These demands have come as a result of the formation of many government corporations and Federal regulatory agencies. Hence, the accounting program required for a Certified Statement of Accomplishment is broad enough to cover not only the regular appropriation accounting of the Federal Government, but also the accounting training needed for many other governmental activities. The program is comprehensive enough to meet both advanced training for the government service, and also, if courses are carefully selected, the usual educational requirements for C.P.A. examinations.

### *Requirements*

1. High-school diploma or equivalent.
2. Thirty-six semester hours of credit in courses outlined below and distributed as follows:
  - a. All of the required courses.
  - b. No less than three semester hours credit from the Accounting Elective Courses.
  - c. No less than six semester hours credit from the Related Elective Courses.
  - d. The remaining six semester hours credit may be taken in either of the two elective groups.

### REQUIRED COURSES

<i>Accounting</i>	<i>Number of Semesters</i>	<i>Semester Hours Credit</i>
Principles of Accounting .....	2	6
Second Year Accounting .....	2	6
Cost Accounting .....	1	3
Auditing .....	1	3
Advanced Accounting Problems .....	1	3

### ACCOUNTING ELECTIVE COURSES

Federal Government Accounting .....	1	3
Federal Tax Accounting .....	1	3
Analysis and Interpretation of Financial Statements	1	2
Mathematics of Finance .....	1	3
Federal Accounting Procedure .....	1	2
Federal Auditing Procedure .....	1	2
or Advanced Federal Auditing Procedure .....	1	2
Budgetary and Financial Administration .....	2	4
Accounting Problems of Regulatory Agencies .....	1	3
Advanced Accounting Problems (Second Semester) ..	1	3

### RELATED ELECTIVE COURSES

Business Law .....	2	4
Principles of Economics .....	2	6
Survey of Statistics .....	1	3
or Elementary Statistical Analysis .....	2	4
Report Writing or Writing for Official Purposes ..	1	2

*Course Numbers and Symbols*—Below 100, non-credit; 100-399, undergraduate; 400-699, graduate and advanced undergraduate (senior); above 699, graduate. Bracketed numbers, not given this year.

—O—

## PUBLIC ADMINISTRATION LECTURES

COMMITTEE ON LECTURE SERIES

JOHN THURSTON (Chairman)

GLADYS L. BAKER	PATTERSON FRENCH, Ph.D., Chief, War Rec-
JAMES W. FESLER, Ph.D., War Production	ords Section, Bureau of the Budget
Board Historian, Civilian Production Ad-	ELMER STAATS, Ph.D., Group Head, Estimate
ministration	Division, Bureau of the Budget

### WHAT WE LEARNED IN PUBLIC ADMINISTRATION DURING THE WAR \*

The Graduate School is arranging this series in the belief that there were many advances in public administration during the war which can profitably be carried over into peace time and have continuing value. This is the seventh in the series of Public Administration Lectures sponsored by the Graduate School.

Special announcement giving time of meeting will be available in the Graduate School after September 1. The fee for the series will be \$3.00; tickets available in the School Office.

1. *Coordination of Wartime Programs.* J. Donald Kingsley, Director of Manpower and Veterans' Affairs, Office of War Mobilization and Reconversion. A discussion of the problems of program coordination which arose during the War and the methods which were evolved to deal with them, as illustrated particularly by reference to the Office of War Mobilization and Reconversion.
2. *Top Management in the War Agencies.* Bernard L. Gladieux, Executive Assistant to the Secretary of Commerce. The top organizational structure and managerial methods through which the chief executive in various wartime agencies directed and controlled his organization.
3. *Management Improvement Techniques.* L. W. Hoelscher, Asst. Chief, Division of Administrative Management, Bureau of the Budget. A discussion of methods used to increase effectiveness and efficiency of operations.

\* Persons desiring one semester hour of graduate credit for these lectures will submit, for the approval of Mr. Thurston, at the beginning of the series, a topic for special study. Credit will be awarded on the basis of papers submitted. Regular fees for one semester hour of graduate credit will be charged.

4. *Relationships between Executive Agencies and Congress during the War.* Roland Young, author of *This is Congress*. Wartime relationships between executive agencies and Congress and the bearing of these relationships upon administration.
5. *Advances in Personnel Administration.* Wallace S. Sayre, Director of Personnel, Office of Price Administration. Advances in personnel administration during the War which have peacetime value.
6. *Informing the People.* Neil Dalton, Deputy National Housing Expediter (Operations), National Housing Agency. A review and evaluation of government information practices during the War.
7. *Federal-State Relations during the War.* William Anderson, Professor of Political Science, University of Minnesota. An evaluation of tendencies and problems in Federal-State relations as illustrated by wartime developments.
8. *Washington-Field Relationships.* Charles S. Ascher, Regional Housing Expediter, Region 2, National Housing Agency. What the War taught us about the organization and operation of field services and their relationships with headquarters.
9. *Lessons of the War: A Summary.* Herbert Emmerich, Director, Public Administration Clearing House. Lessons of the War with respect to principles and methods of organization and management. The strength and weakness of the American administrative system as measured by the test of war.

—O—

#### DIVISION OF GENERAL ADMINISTRATION

##### **341. American National Government**

Spring, 2 credits

CHARLES W. SMITH

History and origins of the national government of the United States; the political process—parties and elections; the legislative process; the functions of the national government and their administration; courts and judicial review of legislation.

##### **344. Introduction to Public Administration**

Fall, 3 credits. Repeated in Spring

JOHN C. RUSSELL

This course is designed to introduce the student to the elements of public administration. Attention will be devoted to the evolution of administrative organization; organizational types: staff, line, and auxiliary agencies and functions; controls of administration; the broadest aspects of personnel selection, classification, training, movement, and relations; budgeting and fiscal control; federal-state relations; administrative legislation and adjudication. The object of the course is to lay a broad foundation for more intensive courses in management. *Prerequisite:* High school graduation or equivalent or one course in the Clerical-Administrative Procedures Group, Department of Office Techniques and Operations.

**Advanced Administrative Procedure**

(See p. 43)

**626. Federal Administrative Management**

Fall, 2 credits. Registration limited to 20

HARVEY E. BECKNELL

An advanced seminar designed to aid persons who are carrying substantial administrative management responsibilities. Emphasis is placed upon the integration of all management functions and the development of a philosophy of management which is equally applicable to all phases. Lectures and discussions cover the following general topics, with particular attention to their interrelationships and interdependence: administrative planning and research; principles of organization; personnel selection, placement, training and relations; administrative leadership, direction, supervision and coordination; administrative reporting; budget formulation and execution; and the auxiliary management services. Practical problems presented by class members for group discussion. *Prerequisite:* Bachelor's degree plus Courses 344 and 624, or bachelor's degree in public or business administration, or experience in administrative management at Grade CAF-9 or above.

**627. Reporting to Top Management**

Fall, 2 credits

RALPH BURTON

Deals with the techniques and substance of reporting to top management in terms of the nature of the top management job and the operator's responsibility for implementing it. Discusses the various kinds of reporting, administrative requirements essential to effective reporting, reporting strategy and techniques, and other factors essential to preparing an effective report to top management. *Prerequisite:* Employment at Grade CAF-11, P-4 or above, or equivalent experience, or consent of instructor.

**400. Administrative Operations for Congressional Assistants**

Spring, 2 credits

(To be announced)

This course deals with the practical administrative problems encountered by secretaries and other staff assistants to U. S. Senators and Congressmen. Such matters as the following will be considered: organizing the office routines; handling veterans' affairs; relations with the executive departments; the practical workings of Congress and assistance with legislative matters; pressure groups; relations with constituents; political organization and campaigns. Enrollment limited to employees of the Legislative Branch, except by consent of instructor.

**The Social Problems of Administration**

(See p. 102)

**Seminar in Economic and Social Implications of current Agricultural Policies**

(See p. 92)

**Problems and Machinery of World Organization**

(See p. 96)

**Systematic Coordination of Management Directives**

(See p. 48)

**Engineering Administration of Government Contracts**

(See p. 112)

**Effective Meetings**

(See p. 24)

## DIVISION OF GOVERNMENT-PUBLIC RELATIONSHIPS

## COMMITTEE ON GOVERNMENT-PUBLIC RELATIONSHIPS

ROBERT LYLE WEBSTER, M.S., Assistant Director of Information, Office of Information, USDA (Chairman)

JOHN CRIDER, B.Litt., Member of the Staff, Washington Bureau, New York Times	ARTHUR ORR, Executive Secretary, Agricultural Sub-Committee on Appropriations, House Appropriations Committee
WILLIAM A. JUMP, Director of Finance and Budget Officer, Office of Budget and Finance, USDA	MORSE SALISBURY, B.S., Committee for Economic Development
WILLIAM V. LAMBERT, Ph.D., Assistant Research Administrator, Agricultural Research Administration, USDA	JOHN THURSTON
VERNON A. MCGEE, M.A., Assistant Chief, Division of Administrative Management, Bureau of the Budget	LYLE F. WATTS, M.F., Chief, Forest Service, USDA

### 710. Seminar in Public Relationships in Government Administration

Fall, 2 credits

R. L. WEBSTER and SPECIALISTS

Intended primarily to give to Federal administrators and those who look forward to executive positions an appreciation of the broad scope and delicate nature of public relationships of a Government agency. It is planned also as a background course for professional Federal information workers. Prominent persons identified with one of the major topics will participate in the treatment of these topics.

Deals with the conduct of external relationships of types of Federal agencies. Course work includes: general review of the broad problem of public relationships as a part of public administration; historical review of the growth of public relations work in the Federal government; comparative analyses of other governments; public reporting and the Congress; brief review of use of mass media for public reporting; field relationships; some aspects of public relationships in international agencies; and the relation of internal management and the agency's public relationships. The question of true public reporting versus propaganda will be explored. *Prerequisite:* Limited to persons holding responsible positions in general or related administrative work, or those in the field of information work, or those who look forward to executive positions and receive the consent of the instructor.

<b>Effective Meetings</b>	(See p. 24)
<b>Graphic Methods of Presenting Statistics</b>	(See p. 38)
<b>Research Methods in Radio Programs</b>	(See p. 39)
<b>Radio and the Human Voice</b>	(See p. 24)
<b>Advanced Public Speaking</b>	(See p. 24)
<b>Writing for Official Purposes</b>	(See p. 23)
<b>Editing</b>	(See p. 22)
<b>Government Letter Writing</b>	(See p. 47)

## DIVISION OF ORGANIZATION AND PROCEDURE ANALYSIS

## COMMITTEE ON ORGANIZATION AND PROCEDURE

HAROLD A. STONE, M.S., Chief, Division of Fiscal Management, Office of Budget and Finance, USDA (Chairman)

OLIVER BRAIN, B.S., Administrative Analyst, Management Planning Division, Department of State

STANLEY T. GORDON, M.S., Management Analyst, Office of Budget and Management, Office of the Secretary, Department of Commerce

SHIRLEY K. HART, M.B.A., Director, Division of Research and Statistics, Federal Housing Administration

THOMAS J. HICKEY, LL.M., Chief, Analysis Section IV, Budget and Organization Division, Budget and Management Branch, Production and Marketing Administration, USDA

LEONARD W. HOELSCHER, Assistant Chief, Division of Administrative Management, Bureau of the Budget

LYMAN MOORE, Ph.D., Assistant Administrator, National Housing Agency

FREDERICK MOSHER, M.S., Assistant Director, Division of Personnel, United Nations Relief and Rehabilitation Administration

ORLANDO A. SIMMES, B.C.S., Acting Chief, Management Planning Division, Department of State

EDWARD B. WILBUR, A.B., Assistant Chief, Management Improvement Branch, Bureau of the Budget

**Advanced Records Management** (See p. 47)

**Office Management** (See p. 45)

**Advanced Administrative Procedure** (See p. 43)

**Problems and Machinery of World Organization** (See p. 96)

## 624. Organizational and Procedural Analysis

Fall, 2 credits

HAROLD A. STONE, JOSEPH P. LOFTUS

Deals with techniques employed in analysis of organizational and procedural problems and in the formulation of recommendations for the solution of such problems. Considerable emphasis is placed upon the different sets of circumstances encountered in the course of such analytical work. Specific case studies are presented for discussion. *Prerequisite:* Admission to the course is restricted to persons who have had several years' administrative experience. All persons are required to file with the Graduate School office a statement as to their reason for taking the course. This may be in the form of a letter from the applicant's immediate supervisor, with a statement on the type of work in which the applicant is engaged. Applicants will be notified of admission or non-admission. In general, in addition to the statement of justified reason for taking the course, minimum requirements are: (a) for persons with an A.B. or B.S. degree or equivalent experience—Grade CAF-5 or above; (b) for persons without a degree or equivalent experience—Grade CAF-7 or above.

## 700. Seminar in Organizational and Procedural Analysis

Spring, 2 credits

HAROLD A. STONE, JOSEPH P. LOFTUS

A continuation of the above course at an advanced level. Subject matter consists almost entirely of case studies illustrating the analysis of different types of organizational and procedural problems. *Prerequisite:* Same as above, plus 624 or full equivalent.

## 519. Work Measurement and Performance Standards

Fall, 2 credits. Repeated in Spring

I. THOMAS MCKILLOP, RALPH R. SHAW and SPECIALISTS

The course will include the study of conventional industrial work measurement and production standards for both mechanical and white-collar jobs; the identification of work units and the study of work records now kept and their applicability to development of production standards; effect of organization and

management on standards, including quality standards, working conditions, inter-relationship of various parts of the work, standards at various organizational levels, administrative problems in installing standards and resulting problems with some administrators and some employees. *Prerequisite:* Practical working experience in administration at Grade CAF-7 or above or permission of instructor.

Lecturers who participated in the course in the Spring Semester, 1946, included Harlow S. Person, Management Consultant; Donald E. Clark, General Inspector, Branch of Administrative Management and Information, Forest Service; Fletcher Waller, Director of Personnel, War Department; Earl W. Lovridge, Assistant Chief, Forest Service; William R. Miller, Manager, Methods Engineering, Transcontinental Western Airlines; Lt. Col. C. F. Mitchim, Control Division, Army Services Forces; and Mrs. Mary Novick, Administrative Analyst, Bureau of the Budget.

## 701. Seminar in Work Measurement and Performance Standards

Spring, 2 credits

RALPH SHAW

Development and analysis of case situations. At the time of registration each student will be required to submit a proposed project for establishment of work standards. The projects will be reported on step by step as the standards involved are developed; each will be discussed and appraised by instructor and students. *Prerequisite:* Satisfactory completion of Course 519, or its full equivalent via written consent of the instructor. Registration limited to 15.

## Graphic Methods of Presenting Statistics

(See p. 38)

### DIVISION OF FINANCIAL AND BUDGETARY ADMINISTRATION

#### COMMITTEE ON BUDGET ADMINISTRATION

ALLEN MANVEL, A.B., Principal Administrative Analyst, Bureau of the Budget (Chairman)

HENRY G. HERRELL, LL.B., Chief, Budget and Organization Division, Budget and Management Branch, Production and Marketing Administration, USDA

VERNE B. LEWIS, M.A., Assistant Budget Officer, Bonneville Power Administration

HOWARD F. SHAMBARGER, M.A., Director, Fiscal Branch, Production and Marketing Administration, USDA

ELMER STAATS

—O—

## Managing Personal Finances

(See p. 88)

## 525. Financial Organization and Procedures of the Federal Government

Fall, 2 credits. Repeated in Spring

CARL W. TILLER

A comprehensive summary presentation of Federal fiscal administration, presented primarily on a lecture basis, and including review of the notes of major participants in Federal financial administration: Treasury, GAO, Congressional Committees, Bureau of the Budget, and operating departments. Designed to provide an understanding of the financial organization and procedure of the Federal Government, including such subjects as the Government fund and account structure, and its revenue structure and administration. An orientation course for persons working in some part of the area of financial administration, such as budgeting or accounting and for potential general or program administration, and others not employed in financial administration. *Prerequisite:* open, without restriction, but catering in part to desires of budget-staff persons for broader orientation in Federal financial structure and procedure.

**635. Agency Budgetary and Financial Administration:  
Budget Formulation**

Fall, 2 credits ALLEN MANVEL and Special Lecturer WILLIAM A. JUMP

First part of an advanced, two-semester program for experienced budget-staff personnel. Covers the broad phases of budgetary and financial administration in the Federal Government primarily from the standpoint of the operating department.

The course deals with the pre-appropriation phases of budgeting, including formulation, review, and congressional enactment of the budget. Topics discussed include: the role of budgeting in program formulation; the role of bureaus, departments, Bureau of the Budget, the President and Congress in budgeting; content of the budget and of departmental estimates and related budgetary materials; the investment and capital-outlay budgets; review and analysis of budget estimates; budget justification; legislative-administrative relationships in budgeting. *Prerequisite: One of the following: Course 344; Course 116 (Office Techniques and Operations); Course 525; experience at a responsible level in budgetary or financial administration; or consent of instructor.*

**Federal Budgetary Procedure**

(See p. 43)

**636. Agency Budgetary and Financial Administration:  
Budget Execution**

Spring, 2 credits RALPH ROBERTS and Special Lecturer WILLIAM A. JUMP

This is the second part of an advanced two-semester course covering the broad phases of budgetary and financial administration in the Federal Government. Several officials from bureau and department budget offices and other budgetary and financial organizations lecture and lead discussions.

This semester deals with the execution of the budget after it is enacted by Congress and the relationships of administrative planning and control, accounting, auditing, and financial reporting to budget execution. *Prerequisite: One of the following: Course 344; Course 116 (Office Techniques and Operations); Course 525; experience at a responsible level in budgetary or financial administration; or consent of instructor.*

**Mathematics of Finance**

(See p. 78)

**Federal Accounting Procedure**

(See p. 44)

**Federal Payroll Procedure**

(See p. 43)

**Federal Government Accounting**

(See p. 78)

**Advanced Federal Auditing Procedure**

(See p. 44)

**Public Finance and Taxation**

(See p. 85)

**Seminar in International Financial and Trade Policies**

(See p. 97)

**Agricultural Finance**

(See p. 94)

**Seminar in Agricultural Finance**

(See p. 95)

## DIVISION OF PERSONNEL ADMINISTRATION

## COMMITTEE ON PERSONNEL ADMINISTRATION

## H. DEAN COCHRAN (Chairman)

JAMES L. BUCKLEY, LL.B., Assistant Director of Personnel, Office of Personnel, USDA  
 VIRGIL L. COUCH, B.S., Chief Personnel Officer, Farm Security Administration, USDA  
 WILLIAM F. HOWELL, M.S., Director, Division of Personnel, United Nations Relief and Rehabilitation Administration  
 HAROLD LEICH, A.B., Examiner in Charge, Administrative Placement Unit, Civil Service Commission  
 ARTHUR B. MCLEAN, M.S., Director of Personnel, Federal Security Agency  
 RICHARD O. NIEHOFF, Ph.B., Director, Administrative Relations Division, Office of the Administrator, National Housing Agency

ROSS POLLOCK, M.A., Assistant Chief, Examining and Personnel Utilization Division, Civil Service Commission  
 O. GLENN STAHL, Ph.D., Assistant Director of Personnel, Federal Security Agency  
 JOSEPH E. WINSLOW, Adviser on Personnel Management, Division of Administrative Management, Bureau of the Budget  
 R. R. ZIMMERMAN, A.B., Administrative Assistant to the President, White House

## 561. Public Personnel Administration

Fall, 2 credits. Repeated in Spring

O. GLENN STAHL

Designed for those in junior personnel staff positions desiring a broad understanding of personnel administration, for those desiring to enter the field and who need foundation for the more specialized courses in the personnel field, and for supervisors and administrators wishing to have general familiarity with personnel work. Personnel problems which arise when people are associated together in a work situation; basic personnel policies and practices necessary and useful in treating personnel problems; differences between responsibilities, with respect to personnel administration, of the supervisor and the personnel officer; the various phases of personnel work; study of merit system and forms of organization; civil service legislation at various governmental levels; relationships between the Civil Service Commission and operating agencies and personnel offices of latter; trends in public personnel administration and its relationship to overall management. *Prerequisite:* One of the following: Course 344; Course 108 or 114 (Department of Office Techniques and Operations); grade CAF-4 or above in personnel work; 60 semester hours of college work.

## Advanced Federal Personnel Procedure

(See p. 45)

## Office Management

(See p. 45)

## 629. Tests and Measurements

Fall, 2 credits

MARION W. RICHARDSON

The various types of psychological tests and measurements. Course covers the field of intelligence, aptitude, achievement, and placement testing. Stress is on the uses of tests and their limitations. The course includes study of some of the most widely used tests of different types, methods of administering them, and interpreting the results. *Prerequisite:* a general course in psychology and one in statistics, or the equivalent.

## Interview Survey Techniques in Social Sciences (See p. 91)

## Psychology of Human Relations

(See p. 99)

## 530. Selection and Placement

Fall, 2 credits

ARTHUR B. MCLEAN

Recruiting, evaluation, probation, placement, and promotion of employees, with special reference to the Federal civil service; lectures and discussions. *Prerequisite:* One of the following: Course 344; Course 561; Grade CAF-4 or above in personnel work; 60 semester hours of college work.

**640. Veterans Legislation and Administration**

Fall, 2 credits. Repeated in Spring

FRANK A. PETRIE and SPECIALISTS

A study of the rights and benefits granted the veteran and his dependents. The historical growth of such enactments as selective service compensation, pensions, insurance, hospitalization, loans, rehabilitation and education, and the rulings and regulations which interpret and apply the statutory provisions. An overview of the organization and functions of the various Federal, state and private agencies rendering benefits to veterans and their dependents.

**559. Position Classification**

Fall, 2 credits. Repeated in Spring

ROBERT L. HILL, WILLIAM C. LAXTON

An introductory course designed to give the student an understanding of the fundamental concepts of position classification and its uses; the relation of classification to compensation and other phases of personnel administration; the historical background of position classification in the Federal service; an analysis of the Classification Act of 1923 and its amendments and its relation to other personnel processes; position analysis and factors to be considered in the allocation of positions. *Prerequisite:* One of the following: Course 344; Course 561; Grade CAF-4 or above in personnel work; 60 semester hours of college work.

**643. Advanced Position Classification**

Fall, 2 credits. Repeated in Spring

JAMES L. BUCKLEY

A study of the practical administration of the Federal classification plan. Emphasis will be placed on the actual methods, policies, and practices that influence allocation of positions. Specific positions and their allocation factors will be discussed. *Prerequisite:* Course 559 or experience in position analysis.

**Social Psychology** (See p. 100)**Conditions of Personality Growth** (See p. 100)**Personality Disorders** (See p. 100)**Principles of Interviewing and Counseling** (See p. 100)**844. Counseling Interview Workshop**

Fall, 2 credits

MARGARET E. BARRON

An intensive study and practice of that kind of interview which is primarily concerned with the feelings, emotions, and attitudes of employees. The interview is studied as an interpersonal situation, with emphasis on seeing those things which are actually happening in it, understanding why both the interviewer and the person being interviewed behave as they do, and evaluating the appropriateness of techniques used to the goals sought. Particular attention is given to the techniques of the nondirective interview and to a study of the kinds of situations in which it is useful. Verbatim reports and practice interviews are both used extensively in working out the best ways of handling various interview situations.

The course will be helpful not only to counselors, but to placement officers and others whose work includes interviewing on various kinds of adjustment problems. Since students are expected to contribute interview material and problems from their own experience, admission is restricted to persons who have had at least a year's experience in work requiring a substantial proportion of interviewing of the counseling type. *Prerequisite:* College graduation plus interviewing experience, or consent of instructor. Limited to 20 students.

**[639.] Employee Training**

**433. Accident Prevention in the Federal Government**

Fall, 2 credits

JOHN H. WETZEL and SPECIALISTS

Designed to aid those who have the responsibility for the safety of employees in the Federal government. It is not too technical for the safety administrator nor too elementary for the trained safety engineer or worker. Includes the history, objectives, benefits and basic concepts of safety programs; the organization and administration of governmental safety programs; and the development of complete action programs to meet the needs of agencies of various types and sizes. Emphasis is placed on the development of sound safety engineering, education and enforcement programs together with accepted accident investigation and reporting procedures.

**633. Employee Relations and Employee Services**

Fall, 2 credits. Repeated in Spring

ASTRID W. KRAUS

This course defines the basic content of an employee relations program, dealing with the formulation of employee relationship policies; the development and application of grievance and other appeals procedures; the techniques for sharing information with employees, for handling employee discipline and for assisting supervisors to appraise and deal with employee problems; the provision of essential employee services, such as housing, child care, transportation, recreation, health and educational information, and so forth, necessary to recruit and maintain an adequate work force. Discussion will also be devoted to the relationship of government as an employer to its employee groups; the history of union-management relationships in the Federal service; present day problems of affiliation, "collective bargaining" and areas of negotiation on policy formulation and settlement of employee grievances. *Prerequisite:* College degree or personnel work at Grade CAF-7 or above or consent of instructor.

**Work Measurement and Performance Standards (See p. 69)****Seminar in Work Measurement and Performance Standards (See p. 70)****658. Law of Federal Personnel Administration**

Fall, 2 credits

RALPH F. KOEBEL, RAWLEIGH L. TREMAIN

Designed to furnish the legal background for courses 561 and 842. Study of legal problems arising out of the Classification Act of 1923, as amended, and other statutory sanctions for Federal employment. Particular topics include: legal aspects of appointment; rates of compensation; hours of employment; overtime pay; promotion; and classification. The effect of wartime legislation on the foregoing matters and on the employment rights of returning veterans will be emphasized. *Prerequisite:* One of the following: Course 344; Course 561 or 842; Grade CAF-5 or above in personnel work; 60 semester hours of college work.

**842. Personnel Division Management**

Fall, 2 credits. Repeated in Spring

VIRGIL L. COUCH

Application of subject matter covered in 561. Full instruction and guidance with reference to establishment and operation of the personnel activity of an agency. Problems of internal management in personnel offices and problems of personnel division organization; operating relationships between the personnel office and other staff and line organizations; means of coordinating the respective phases of personnel operations; budgeting and relative cost of a personnel program; how to influence supervisors and others who must carry the responsibility

for supervision as a phase of personnel administration; how to make and issue personnel policy; how to plan personnel programs; how to use technicians, deputies and specialists; and types of organization for personnel administration, such as centralized and decentralized and combination types of organization structure. *Prerequisite:* Course 561 or employment in personnel work at grade CAF-9 or above; or consent of instructor, such consent being based on a review of the training and experience of the applicants.

## DIVISION OF LEGAL ADMINISTRATION

### COMMITTEE ON LEGAL ADMINISTRATION

ASHLEY SELLERS, S.J.D., Attorney at Law (Chairman)

JOHN ANDREWS, LL.B., Chief, Federal State Relations Section, Office of the Assistant Solicitor General, Department of Justice  
 THOMAS C. BILLIG, S.J.D., Assistant Solicitor, Department of Interior  
 JAMES DOYLE, LL.M., Associate Solicitor, Office of the Solicitor, USDA  
 THOMAS J. FLAVIN, LL.B., Judicial Officer, Office of the Secretary, USDA  
 RALPH F. FUCHS, LL.B., Special Assistant to the Attorney General, Office of the Solicitor General, Department of Justice

RALPH F. KOEBEL, S.J.D., Chief, Research and General Legal Services Division, Office of the Solicitor, USDA  
 DAVID REICH, LL.B., Attorney, Office of the Assistant Solicitor General, Department of Justice  
 HOWARD WAHRENBROCK, S.J.D., Assistant General Counsel, Federal Power Commission  
 WALTER B. WOODEN, LL.B., Assistant Chief Counsel, Federal Trade Commission

—O—

### Business Law

(See p. 78)

### [663.] Legal Aspects of Investigation—Criminal Evidence and Procedure

### Law of Federal Personnel Administration

(See p. 74)

### 717. Administrative Law and Procedure

Year, 2 credits each semester

THOMAS J. FLAVIN

Analysis of procedural problems arising at the various stages of administrative proceedings in Federal agencies. Materials for discussion will include statutes, administrative regulations, reports of proceedings, critical studies, and judicial decisions. Particular attention will be paid to the problems encountered by those who participate in administrative proceedings in various capacities, such as counsel and trial examiners, including problems involved in formulation of issues, presentation of evidence, scope of cross-examination, preparation of examiners' reports, oral argument before ultimate authority, formulation of findings and opinions, etc. *Prerequisite:* Bachelor's degree in public administration, public utilities, or public law; law degree; or experience in regulatory work, or course in constitutional or administrative law, or satisfactory demonstration to instructor of other qualifying education or experience.

### Traffic Management

(See p. 105)

### Imperfect Competition and Public Regulation

(See p. 86)

### Regulation of Communications

(See p. 103)

### Contracts and Specifications

(See p. 113)

### Patent Law for Executive and Scientific Personnel

(See p. 114)

## DIVISION OF PROCUREMENT AND PROPERTY MANAGEMENT

## COMMITTEE ON PROCUREMENT AND PROPERTY MANAGEMENT

JAMES SCAMMAHORN, Chief, Division of Purchase, Sales and Traffic, Office of Budget and Finance, USDA (Chairman)

SIDNEY ADAMS, LL.B., Administrative Officer, Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, USDA

WAYLA C. ELLIS, Chief, Equipment and Supply Section, Division of Operation, Forest Service, USDA

WILLIAM E. FEE, LL.B., Assistant Chief, Administrative Services Division, Soil Conservation Service, USDA

CLIFTON E. MACK, LL.B., Director of Procurement, Procurement Division, Treasury Department

CHARLES E. OFFUTT, Associate Chief, Administrative Services Division, Budget and Management Branch, Production and Marketing Administration, USDA

S. A. SNYDER, Deputy Director, Stores Distribution Branch, Procurement Division, Treasury Department

RAY WARD, A.B., Chief, Property Management Program, Bureau of the Budget

—O—

## Advanced Federal Purchasing Procedure

(See p. 46)

## 637. Management of Governmental Purchasing

Fall, 2 credits

JAMES SCAMMAHORN

An advanced course designed for employees interested in becoming acquainted with the broad phases of handling and managing Government purchasing activities. Arranged to be especially useful to employees engaged in budget and personnel activities who need some general knowledge of procurement office functions. Deals with purchasing policies, organization and management, finances, and laws governing purchasing. Topics: (1) Organization and management of purchasing offices; (2) organization and management of warehouses; (3) property accounting, management and distribution of supplies and equipment; (4) management and training of purchasing and warehousing personnel; (5) procurement function efficiency determination; (6) importance of project service objective and its relation to good Government purchasing and warehousing; (7) nature of public contracts as compared with private contracts; (8) specification studies including development and writing; (9) delivery requirements, inspection of supplies and liquidated damages; (10) market analysis and conditions which affect seasonal project work of Government bureaus; (11) laws which affect procurement contracts such as Walsh-Healy Act, Davis-Bacon Act, Eight-Hour Law; (12) functions of General Accounting Office, Procurement Division, Federal Prisons Industries and surplus disposal agencies in the purchasing scheme; (13) shipping point problems and transportation studies on methods of shipment; (14) new developments in procedures affecting purchasing and dissemination of information to field purchasing units. *Prerequisite:* One of the following: Course 344; Course 115 (Department of Office Techniques and Operations); Grade CAF-4 or above in purchasing work; 60 semester hours of college work.

## Contracts and Specifications

(See p. 113)

## Engineering Materials

(See p. 113)

## Textile Design and Fabric Development

(See p. 121)

## 549. Property Management

Spring, 2 credits

RAY WARD, assisted by

DANIEL N. MANDELL, HARRY T. MILLER and HAROLD B. VASEY

Designed to furnish persons currently employed in property records and management work an opportunity for upgrading on the job through a short,

intensive study of the principles and practices of property records and their management. Persons employed in other administrative work may gain a knowledge and understanding of the significant Federal statutes, administrative orders and other regulatory procedures related to a variety of management problems which will assist them in becoming overall executives.

Chief objectives are to acquaint the student with: the essentials of acquiring surplus property and equipment from disposal agencies; sales of property between agencies under the Economy Act; explanation of the utilization, conservation, management and control of property as related to inventory, accountability, record controls and reporting, standards of inspection and maintenance, warehousing, and training of equipment operators; disposition of property, after survey, by donation, sale or exchange; and a general summary of overall property management problems. *Prerequisite:* One of the following: Course 344; 108 or 117 (Department of Office Techniques and Operations); Grade CAF-4 or above in purchasing work; 60 semester hours of college work.

### DIVISION OF ACCOUNTING

#### COMMITTEE ON COMMERCIAL AND GOVERNMENTAL ACCOUNTING

WILLIAM H. ROWE, M.S., Chief, Program Planning Section, Underwriters Division, Federal Crop Insurance Corporation, Production and Marketing Administration, USDA (Chairman)

PAUL L. APPELMAN, Examiner in Accounting, Civil Service Commission  
 NORMAN L. BURTON, M.B.A., Chief, Contract Review Branch, Procurement Policy Division, Civilian Production Administration  
 WARNER H. HORD, M.B.A., Chief, Accounting and Rates Division, Civil Aeronautics Board

CHARLES N. MASON, M.A., Assistant Chief, Budget and Organization Division, Budget and Management Branch, Production and Marketing Administration, USDA  
 ROBERT W. MAXWELL, M.A., Commissioner of Accounts, Treasury Department  
 HERSCHEL C. WALLING, M.B.A., Principal Budget Examiner, Bureau of the Budget

See page 63 for a suggested program of study and for the requirements for a Certified Statement of Accomplishment in Accounting.

### Federal Accounting Procedure

(See p. 44)

#### 352<sup>a</sup>. Principles of Accounting—First Half

Fall, 3 credits. Repeated in Spring

WILLIAM H. ROWE, WILLIAM L. DYE, WILLIAM K. BROWNOLD

Elementary principles of accounting; discussion and problems. At the end of the semester students will be prepared to do the accounting necessary for a small business organization; i.e., keep a complete set of books, draw up statements at the end of the fiscal period, adjust the accounts for accruals, deferred items, depreciation, etc., and close the books. *Prerequisite:* High school graduation or equivalent.

#### 352<sup>b</sup>. Principles of Accounting—Second Half

Fall, 3 credits. Repeated in Spring

WILLIAM L. DYE, WILLIAM H. ROWE

Continuation of first half covering more advanced principles of accounting; accounting for partnerships, corporations and manufacturing; depreciation policies and analysis of financial statements. *Prerequisite:* Course 352<sup>a</sup>.

#### 353<sup>a</sup>. Intermediate Accounting—First Half

Fall, 3 credits

WARNER H. HORD

Advanced principles of manufacturing accounting, corporation accounting, and valuation as applied to current assets, fixed assets, intangibles, and liabilities, reserves and funds, installment sales. *Prerequisite:* A first year course in accounting.

**353<sup>b</sup>. Intermediate Accounting—Second Half**

Spring, 3 credits

WARNER H. HORD

Advanced principles of partnership accounting, including formation, operation, and dissolution; joint ventures; consignments; agencies and branches; consolidated balance sheets and income statements; application of funds; accounting for insolvent and bankrupt concerns; estates and trusts. *Prerequisite:* Course 353<sup>a</sup>, or equivalent.

**422. Business Law**

Year, 2 credits each semester \*

ELMER MOSTOW

Aspects of law essential to the conduct of modern business. Forms of business organization, bailments, property, sales, mortgages, negotiable instruments, contracts. *Prerequisite:* Principles of Economics, Intermediate Accounting or equivalent.

**354. Federal Government Accounting**

Fall, 3 credits. Repeated in Spring

CHARLES N. MASON

A review of the development of the accounting system for Federal funds and a detailed study of appropriation, fund, receipts, and governmental corporation accounting. Special emphasis is given to the accounting problems of administrative agencies. The Treasury Department and General Accounting Office relationships to the accounting system are covered. Specialists in their respective fields assist in the course. *Prerequisite:* Principles of Accounting or Federal Accounting Procedure, or one year of experience with the Federal system of accounting.

**642. Cost Accounting**

Fall, 3 credits

ALFRED D'ALESSANDRO

A thorough and comprehensive treatment of the principles of cost accounting, together with the methods of their application to specific problems. By means of lectures, textbook study, and problems, full consideration is given to the methods of cost accounting for materials, labor, direct and indirect expenses in their relationship to specific job orders; process, departmental and standard costs; and the control accounts. *Prerequisite:* Principles of Accounting.

**645. Federal Tax Accounting**

Fall, 3 credits

EUGENE C. MOYER

Federal taxation presented from the accounting viewpoint. Special attention given to income taxation. *Prerequisite:* Principles of Accounting; accounting experience desirable.

**Advanced Federal Auditing Procedure**

(See p. 44)

**693. Auditing**

Spring, 3 credits

HERBERT G. MARSHALL

The purposes and types of audits are studied. Consideration is given to such problems as the planning and performing of audits, principles and auditing of different types of audits, audit working papers and reports, and responsibility of the auditor. *Prerequisite:* Intermediate Accounting.

**423. Mathematics of Finance**

Spring, 3 credits

RALPH R. BOTTS

Calculation of compound interest, compound discount, sum of annuities, present value of annuities and perpetuities; accumulation of sinking funds and

\* This course is so arranged that students may attend both semesters or either semester. No subject matter, however, will be repeated.

amortization of debts by installments. Calculation of bond yields, bond values, premiums and discounts. Computation of depreciation by sinking fund method and fixed percentage of book value method. Some study is given to life probabilities and the computation of premiums and reserves for the more common types of life insurance and annuities. Accounting applications and entries will be discussed for those students interested in the accounting aspects.

### **646. Advanced Accounting Problems**

Year, 3 credits each semester

L. W. ACKER

This course is intended primarily to furnish a coverage of miscellaneous accounting problems for general review and partially to serve as CPA examination review. It will include financial statements, municipal (fund) accounting, corporation accounting, partnership accounting; consolidation intercompany accounting; company accounting; accounting theory and other processes of accounting. Second semester emphasis is placed on such subjects as accounting systems, and accounting for management purposes. Principal emphasis in the course will be placed on the working of problems at home and in class. Class discussion of these problems will be held, and loose leaf solutions will be distributed after the problems have been worked and discussed. Supplemental reading on the subject matter of the problems will be done by the student for his own benefit and at his own option. *Prerequisite:* Three years' accounting training. With instructor's permission, however, the course may be taken concurrently with third year accounting.

### **[647.] Analysis and Interpretation of Financial Statements**

Writing for Official Purposes

(See p. 23)

## Department of Social Sciences

### DEPARTMENTAL COMMITTEE

FREDERICK V. WAUGH, Ph.D., Chief Agricultural Economist, Production and Marketing Administration, USDA, on loan as Consultant to Office of War Mobilization and Reconversion (Chairman)

PHILIP M. HAUSER, Ph.D., Assistant to the Secretary of Commerce and Assistant Director, Bureau of the Census, Department of Commerce

SHERMAN E. JOHNSON, Ph.D., Assistant Chief for Production Research, Bureau of Agricultural Economics, USDA

RENSIS LIKERT, Ph.D., Head, Division of Program Surveys, Bureau of Agricultural Economics, USDA

JAMES G. MADDOX, M.A., Economic Analyst, Bureau of Agricultural Economics, USDA

JOHN PROVINSE, Ph.D., Assistant Commissioner, Office of Indian Affairs, Department of Interior

HAROLD B. ROWE, Staff Member, Brookings Institution

J. MURRAY THOMPSON, Ph.D., Assistant Director, Western Region, Field Service Branch, Production and Marketing Administration, USDA

### PURPOSE AND SCOPE

Social science deals with people and the problems of human relationships, as contrasted with natural or physical science which deals with things and the problems arising out of physical relationships.

The problems of social organization and operation have become both absolutely and relatively more important with the increase in complexity of our industrial civilization. More and more, people are concerned with the organization of production, the distribution of goods and income, and with price policies. The individual as a consumer and investor, the businessman and the farmer as producers, find increasing need for a knowledge of economics and other social sciences. Large corporations are employing growing numbers of economists to help in the formulation of policy. Psychologists and social workers are finding a demand for their services in personnel work. And, the large number of Federal, state and local government agencies need more people adequately trained in social science.

Social science is divided into a number of closely allied fields including economics, sociology, political science, history, law, and psychology. A broad grasp of any one of these subjects implies at least some familiarity with the others, because of the many interrelationships among these studies. Yet the continued development of each social science has given rise to larger and still larger bodies of knowledge relating to it, until only through a considerable degree of specialization can the student hope to master any one part. Thus the great need is for people who have concentrated sufficiently on one phase of a social science, such as marketing in economics, to be thoroughly familiar with the details of fact and prin-

ciples involved, yet who also have a broad underlying training in the allied fields.

The courses offered by the Graduate School are designed to aid in acquiring a general background in the social sciences, as well as the specialized training in particular fields which is necessary for successful work in many Government departments and in private business.

But not all of those engaged in occupations connected with the social sciences can hope to attain a complete general as well as specialized background, at least for some time to come. They will be interested, rather, in courses designed to fit them better for doing some specific job which is not connected with research, policy formation or general administration. An employee in the personnel office of a Department of Agriculture branch responsible for market news and inspection services may wish to take a course in marketing in order to learn something about the subject matter dealt with by the personnel of the branch, or a course in psychology as an aid in dealing with the personal problems which are daily presented to employee counselors. The secretary to an economic research director may want a course in the principles of economics in order to become familiar with the terminology and general economic concepts to which her stenographic and filing duties relate. An almost unending array of job needs of this kind offers opportunities to the alert and ambitious employee to increase his capacity and usefulness to his employer. The many promotions within the Government service which can be traced directly to such training testify to the fact that study in the social sciences is profitable.

#### GROWING NEED FOR TRAINED WORKERS

It is extremely important that Government policies, relating to the economic and social life of the Nation, be based on competent studies of the probable effects of alternative lines of action. To forecast accurately what will happen and to point out clearly the good and bad effects which may result from any proposed course of action is the major service which social scientists may render to the people of this country.

Washington is an excellent place to study problems of this kind. The principal Federal programs in the economic and social fields are administered in Washington and new proposals constantly are being considered both by the Congress and by the agencies responsible for the administration of those programs. Moreover, Washington is growing in importance as a center for the discussion and actual administration of international programs.

## SUGGESTIONS FOR PROGRAM OF STUDY

To meet the specific needs of students who have different educational and experience backgrounds and different immediate interests, the Graduate School has developed the following types of courses in the social sciences:

- (1) *Vocational Courses.* This group of courses is designed for vocational training either in the field in which the student is directly engaged in his day to day work or in a related field that provides background for his present assignment or perhaps training for professional advancement. Courses in this group are not of graduate level. They are comparable to the strictly vocational courses in an agricultural college curriculum. Provision is made for undergraduate credit if the student desires it.
- (2) *Undergraduate Basic Courses.* These courses are designed to provide a basic social science background for students who have not completed their undergraduate training or who have not had an opportunity to take the basic background work in economics and the other social sciences as a part of their qualification for Bachelor's degree work. These courses provide an opportunity for persons who enter the Government service in the lower grades to prepare themselves for professional advancement.
- (3) *Graduate and Advanced Undergraduate Courses.* These courses offer work of graduate level but they are also open to undergraduates of advanced standing. Students who are registered for graduate credit will be expected to do more work in these courses than those who register for undergraduate credit.
- (4) *Strictly Graduate Courses.* These courses are offered only for graduate students who have adequate background. They are usually conducted on a seminar basis and they require a great deal of participation and preparation of material by the students themselves.

The Graduate School does not offer either undergraduate or advanced degrees, but it is possible for a student who is interested in working toward a degree to organize his work in the Graduate School in such a way that he will fulfill some of the requirements of the institution where he expects to obtain a degree. If possible, the course of study should be outlined in consultation with advisers at the institution where the student expects to take his degree. Students who have not decided on the institution where they expect to

complete their work but who wish to specialize in economics or in one of the other social sciences should select basic courses leading toward degree work, in consultation with designated advisers of the Graduate School.

*Basic Undergraduate Courses for a Major in Economics.* Students working toward a Bachelor's degree with specialization in economics should plan to complete the following courses either in the Graduate School or at some other institution:

1. Principles of Economics	3. Economic History
2. Elementary Statistical Analysis	4. Money and Banking
5. Public Finance	

In addition to these courses, the students looking forward to concentration of work in agricultural economics should plan to complete undergraduate courses in Economics of Marketing and Economics of Farm Production. An elementary course in accounting should also be included if the student plans to major in prices and marketing. Undergraduate students who expect to major in one of the other social sciences should consult designated advisers in the Graduate School.

*Graduate Courses.* Students working for graduate degrees should consult educational advisers in the institution where they expect to receive their degree. If they have not selected such an institution they should confer with advisers in the Graduate School who are teaching in the particular field in which they expect to concentrate. In general, students who wish to map out a course of study leading toward a graduate degree should plan their work along the following lines:

- (1) Completion of basic undergraduate courses.
- (2) Advanced courses in social science fields related to the particular field of concentration. For example, a student majoring in economics should consider advanced courses in statistics, economic history, sociology or some other related field in order to broaden his educational background.
- (3) Advanced courses in the field of concentration. Students who expect to major in one of the social science fields should begin their graduate work by taking the basic graduate courses in that special field. For example, students who expect to major in any field of economics should plan to take at least six credits of work in advanced economic theory and six credits in monetary and cycle theories. With these courses as a foundation, the student can begin to specialize in courses in his particular field of concentration.

**CERTIFIED STATEMENT OF ACCOMPLISHMENT IN  
AGRICULTURAL ECONOMICS**

The Graduate School offers a Certified Statement of Accomplishment to students who have completed 30 credits of graduate work in agricultural economics, including the basic graduate courses in economics. To qualify, it is necessary to follow the specific sequence of courses that are listed for three fields of concentration indicated below.

The Certified Statement of Accomplishment is not an advanced degree, but it constitutes evidence of completion of an organized course of study in the field of agricultural economics. It is a certification that the student has completed a program of study which prepares him for effective public service in agricultural economics work. (See p. 11.) The Graduate School plans to extend the granting of Certified Statements of Accomplishment to other social science fields as soon as there is sufficient demand.

**COURSES LEADING TO CERTIFIED STATEMENT OF ACCOMPLISHMENT  
IN AGRICULTURAL ECONOMICS**

*(With Concentration in Specified Fields of Application)*

<i>Economics of Production</i>	<i>Agricultural Finance</i>	<i>Prices and Marketing</i>
--------------------------------	-----------------------------	-----------------------------

**BASIC UNDERGRADUATE COURSES**

Required foundation courses. Carry undergraduate credit only and may not be used to meet the credit hour requirement for the certified statement. Equivalent courses will be accepted by transcript from other institutions.

The number in parenthesis after course title indicates semester hour credits.

Principles of Economics (6)	Principles of Economics (6)	Principles of Economics (6)
Elementary Statistical Analysis (4)	Elementary Statistical Analysis (4)	Elementary Statistical Analysis (4)
Economics of Farm Production (3)	Economics of Farm Production (3)	Economics of Farm Production (3)
Economics of Marketing (3)	Economics of Marketing (3)	Economics of Marketing (3)

**REQUIRED BASIC GRADUATE COURSES**

Imperfect Competition and Public Regulation (6)	Imperfect Competition and Public Regulation (6)	Imperfect Competition and Public Regulation (6)
Monetary and Employment Theories (6)	Monetary and Employment Theories (6)	Monetary and Employment Theories (6)

**REQUIRED SPECIALIZED GRADUATE COURSES**

Farm Management (4) or Land Economics (4)	Agricultural Finance (3)	Market Organization for Production of Marketing Services (3)
Seminar in Agricultural Price and Income Policy (3)	Farm Management (4) or Land Economics (4)	Market Structure and Price Determination (3)
Seminar in Economics of Production (3)	Seminar in Agricultural Finance (3)	Seminar in Agricultural Price and Income Policy (3)
		Seminar on Marketing (3)

**ELECTIVE GRADUATE COURSES**

Select courses in consultation with Graduate School advisers to complete the 30 graduate credits required for certified statement of accomplishment.

## DIVISION OF GENERAL ECONOMICS

## COMMITTEE ON GENERAL ECONOMICS

MORDECAI EZEKIEL, Ph.D., Economic Adviser, Bureau of Agricultural Economics, USDA (Chairman)

H. M. DOUTY, Ph.D., Director of Labor Economics, Bureau of Labor Statistics, Department of Labor

HOWARD S. ELLIS, Ph.D., Assistant Director, Division of Research and Statistics, Federal Reserve Board

EVERETT F. HAGAN, Ph.D., Chief, Division of Fiscal Policy and Program Analysis, Office of War Mobilization and Reconversion

PHILIP M. HAUSER

HOWARD S. PIQUET, Ph.D., Special Adviser, Office of War Mobilization and Reconversion

STEPHEN RAUSCHENBUSH, B.A., Chief, Branch of Economics and Statistics, Division of Power, Department of Interior

MARGARET G. REID, Ph.D., Head, Family Economics Division, Bureau of Human Nutrition and Home Economics, Agricultural Research Administration, USDA

—O—

*Course Numbers and Symbols*—Below 100, non-credit; 100-399, undergraduate; 400-699, graduate and advanced undergraduate (senior); above 699, graduate. Bracketed numbers, not given this year.

—O—

## GENERAL ECONOMIC THEORY

## 200. Introduction to Economics, Theory and Institution

Fall, 2 credits

BUSHROD W. ALLIN

This course is largely a study of the place of collective action in economic theory. Institutions are defined as collective action in control of individual action. These take the forms of corporations, trade unions, farm organizations and decisions of the Supreme Court. Theory is interpreted as referring to mental tools useful for understanding and dealing with contemporary economic and social problems.

## 201. Principles of Economics

Year, 3 credits each semester

FREDERICK L. THOMSEN

An examination of the nature, validity, and significance of the fundamental principles of economics. Designed to give the student the understanding of basic concepts necessary for advanced study in the field of economics and for the better understanding of materials dealt with in applied courses. The relation between economic theory and scientific methods. The organization of the economic system: production, consumption, exchange, and the distribution of income and wealth. The relation between economic institutions and so-called economic laws. Although the significance of basic principles will be interpreted in relation to current events and problems, the course is primarily designed to furnish an understanding of the scientific aspects of economics which have continuing application under changing world conditions.

## 418. Public Finance and Taxation

Spring, 2 credits

E. GORDON KEITH

Government revenues, expenditures, debts, financial administration; taxation; equity in distribution of tax burdens, shifting and incidence of taxation; types of taxes, excise, income, property, excess profits, etc. *Prerequisite:* a course in economics.

## Monetary and Employment Theories

(See p. 87)

**705. History of Economic Thought**

Fall, 3 credits

MAX J. WASSERMAN

The economic theories of the most important schools and economists from Greek antiquity through Alfred Marshall (1895). The schools covered are the Greek, Medieval Period, Mercantilism, Physiocrats, the Classical School, Socialism of 1848, Historical School, Psychological School and the Neo-Classical School. The theories studied are projected against the factual and philosophical background of the period. *Prerequisite:* Course 201 or equivalent.

**741. Contemporary Economic Thought**

Spring, 3 credits

BUSHROD W. ALLIN

A review of the ideas of the leading economic theorists of the past fifty years, including those of Marshall, Veblen, Commons, Mitchell and Keynes. *Prerequisite:* Course 201 or equivalent.

**Psychological Foundations of Economics**

(See p. 100)

**Economics of Contemporary Policies**

(See p. 92)

**[706.] Econometrics: Mathematical and Statistical Analysis of Economic Problems**

R. O. BEEN

**[707.] Economic History of the United States (1947-48 and alternate years)****[708.] Economic History Between the Two World Wars (1947-48 and alternate years)****709. Structure of American Business**

Fall, 2 credits

HARRY MAGDOFF

A review of the size, structure, and types of control in American business today; evaluation of business practices with respect to investment, prices, and costs as they affect structure of business; comparison of size of business, degree of integration and concentration of different lines of business; the reasons for these differences and their implications for current economic policy. *Prerequisite:* General background in economics, or equivalent as approved by instructor.

**[710.] Regional Economics, National and International (1947-48 and alternate years)****Seminar in Policy Problems in Resource Utilization, Development and Conservation**

(See p. 92)

**711. Imperfect Competition and Public Regulation**

Year, 3 credits each semester

GARDINER C. MEANS

First semester: Critical re-examination of basic premises and underlying theories of competitive price determination; intensive study of newer theoretical techniques for the analysis of pricing under conditions intermediate between "perfect competition" and "pure monopoly" described recently as conditions of "monopolistic" or "imperfect" competition. Study of extent of limitations on competition and of concentration of private control in the American economy

and of actual institutional practices of price determination in specific markets in industries characterized by imperfect competition, such as rubber tires, agricultural implements, drugs, meat packing, fertilizers, automobiles, canning, etc.

Second semester: Appraisal of objectives, methods, and achievements of public efforts to deal with imperfect competition and monopoly, including Food and Drugs Act and fair trade laws, anti-trust acts and enforcement, cartel controls, public utility regulation, encouragement of competition from cooperatives, "yardstick" competition by publicly-owned undertakings, etc. Officials of the Anti-Trust Division, I.C.C., Federal Trade Commission, T.V.A., Federal Communications Commission, state and local utility commissions, and of other regulatory agencies will be invited to present and discuss their objectives, achievements, and problems. *Prerequisite:* Training in economics or equivalent in general experience subject to approval of instructor.

### Patent Law for Executive and Scientific Personnel

(See p. 114)

#### MONETARY AND FISCAL

### 401. Monetary and Employment Theories

Year, 2 credits each semester

EVERETT E. HAGEN

First semester: Review of the over-all operation of the monetary and financial system; determination of the level of prices in terms of the quantity equation, with emphasis on definition of terms and implication of the truism embodied in the equation.

Second semester: An elementary introduction to problems involved in maintaining full employment in the American economy. Special attention is given to: (1) an analysis of factors causing unemployment in the past, (2) the problems to be solved in maintaining full employment in the future, (3) the interest of farmers and other groups in society in maintaining full employment, and (4) a critical analysis of various proposals for maintaining full employment in the United States. *Prerequisite:* Principles of Economics and a course in *one* of the following: money and banking, business cycles or public finance.

### International Financial and Trade Policies

(See p. 97)

### 402. Measurements of Economic Activity

Spring, 2 credits

JAMES P. CAVIN

Designed especially for the Washington area where many people are engaged in studying and interpreting economic activity. Measures of such activity include measures of employment and unemployment, wages and hours, monetary statistics, price indices, production indices, and the national income and its components. It is not the purpose of the course to cover in detail the technical problems involved in computing these various measures but rather to acquaint the student with the concepts underlying them and their limitations and interrelations, so that he would be able to utilize them effectively and interpret them correctly. *Prerequisite:* Principles of Economics and a course in statistics.

### 703. Modern Monetary and Business Cycle Theories

Spring, 2 credits

WILLARD W. COCHRANE

Modern theories of employment, output, and prices, including those of Hansen, Keynes, Robertson, and the Stockholm group, with some attention to their critics. The theories of each school are analyzed with respect to (1) inner consistency, and (2) contribution to an explanation of variations in the level of employment, output, and prices in the operating economy. A synthesis of the theories listed and the possibility of effecting a fusion with "orthodox" economic theory are explored, and policy implications examined. *Prerequisite:* Monetary and Employment Theories, or equivalent.

## INTERNATIONAL TRADE

**704. Economic Theory of International Trade (Alternate years)**

Year, 2 credits each semester

H. J. WADLEIGH

The classical and neo-classical theories of international trade and finance as developed by Ricardo, Taussig, Ohlin and others, with applications to current international economic problems. *Prerequisite:* Training in economics or equivalent in general experience as approved by instructor.

**International Financial and Trade Policies**

(See p. 97)

**Seminar in National and International Policies Affecting Agriculture**

(See p. 98)

## CONSUMPTION ECONOMICS

**300. Marketing from Consumer's Point of View (alternate years)**

Fall, 2 credits

H. M. SOUTHWORTH

Appraisal of the market from the standpoint of consumers, and analysis of programs and conditions affecting it.

**Marketing Consumer Goods**

(See p. 90)

**325. Managing Personal Finances**

Fall, 2 credits. Repeated in Spring

HAROLD C. LARSEN, assisted by  
MESSRS. BOTT, DETRICH, KOEBEL and PHENIX

Renting versus owning a home; costs of home ownership; methods and mathematics of financing; characteristics of deed, abstract, mortgage, trust, contract, and notes; financing durable and other consumer goods; sources and costs of consumption credit and installment buying; characteristics of major types of investments, stocks, bonds, debentures, mortgages, notes, savings accounts, and property; provisions for retirement, Federal retirement system and options, social security and other retirement systems. Insurance: choosing a company, features of principal life insurance and annuity contracts, protection versus savings, nonforfeiture privileges, settlement options, and property, liability and other insurance programming. Planning and administration of estates, joint ownership, laws of intestacy, making a will, administration of estates as executor or administrator, proof of will, costs and fees.

**Mathematics of Finance**

(See p. 78)

**Domestic Architecture**

(See p. 117)

**422. The Economics of Clothing and Textiles**

Fall, 2 credits

MARGARET L. BREW

Particular emphasis will be given to the effect of income and other factors on the demand for clothing and household textiles. National trends in consumption. Problems in the preparation of clothing budgets. Indexes of clothing and textile prices. Production and marketing costs. The standardization, simplification, and labeling of textiles and clothing. This advanced course is designed for people who are now working in textiles and clothing and wish to study the economic aspects of the field. *Prerequisite:* Training or work in textiles and a general course in economics, or equivalent as approved by instructor.

**Survey of Recent Technical Development in Textiles**  
*(See p. 121)*

**419. Standards of Living**

Spring, 2 credits

ISABELLE M. KELLEY

Methods of investigating standards of living, statistical, historical, cultural; concepts of standards, levels and scales; "adequate" standards and methods of measuring them; government policy with respect to standards of living.

**Recent Advances in Animal and Human Nutrition**

*(See p. 19)*

**Functional House Planning**

*(See p. 117)*

**[420.] Economics of Health Services** (1947-48 and alternate years)

FREDERICK D. MOTT

**[421.] Economics of Food** (1947-48 and alternate years)

MARGARET G. REID

**LABOR ECONOMICS**

**403. Labor and Social Legislation Abroad**

Year, 2 credits each semester

FAITH M. WILLIAMS, assisted by

JEAN A. FLEXNER, JULES HENRY, IRVING KRAVIS and OSCAR WEIGERT

A survey of the status of labor in the major countries abroad, and of the economic programs of organized labor. Attention is focused on a few key countries, and comparative material on wages, hours of labor, working conditions, trends in prices and cost of living, social legislation and related subjects will be extensively explored. Consideration is given to the nature and scope of trade union organization, and collective bargaining procedure. International labor organizations and agencies also receive attention. There is increasing interest in this country in labor abroad, and what labor abroad does affects the United States more directly than ever before. The basic aim of this course is to provide factual insight into comparative living and working standards, into the nature of labor organizations and programs abroad, and to follow ILO and UN procedures. *Prerequisite:* A course on the labor situation in the United States or a course in elementary economics, or the equivalent.

**Employee Relations and Employee Services** *(See p. 74)*

**Farm Labor and Tenure Problems** *(See p. 101)*

**Agricultural Employment and Wages** *(See p. 101)*

**Rural Social Policies in the U. S. and Other Countries**

*(See p. 92)*

**MARKETING**

**203. Economics of Marketing** (alternate years)

Fall, 3 credits

BENNETT WHITE

A preliminary course intended to provide orientation for the study of marketing as (1) a type of production which supplies essential services, and (2) a

valuation process in which the prices of agricultural commodities are established. Marketing machinery, costs, functions, methods and practices, including the economics of advertising, are surveyed. *Prerequisite:* Principles of economics or the equivalent.

#### 404. Market Analysis

Spring, 2 credits

(To be announced)

The purpose of market analyses and their relation to state of the economy; sources of data, techniques of tabulation and analysis for market surveys; translation of marketing survey to a marketing program; allocation of market quotas; role of marketing agencies; setting up of sales organizations, development of sales and advertising techniques in relation to marketing programs. *Prerequisite:* Principles of economics or a general course in marketing or the equivalent.

#### 405. Marketing Consumer Goods

Fall, 2 credits

JOHN ALBRIGHT

Consumer spending and saving practices; make-up of consumer market; income distribution and special characteristics of population, by age, nationality, region as related to consumer demand; methods of estimating consumer demand and developing marketing program; alternate methods of marketing consumer goods. *Prerequisite:* A general course in marketing and preferably also a course in retailing, or the equivalent in experience as approved by instructor.

#### 406. Marketing Industrial Goods

Spring, 2 credits

EARL A. GRAHAM and SPECIAL LECTURERS

Economic factors affecting demand and supply of: (a) production tools and facilities, (b) raw materials, parts and components and (c) production supplies and services; methods and effects of calculating overhead costs, long and short-term depreciation and obsolescence policies, technological obsolescence; interest rates and Government fiscal and tax policies; alternative methods of marketing industrial goods—market measurement, sales engineering and management, etc. The relation to industrial marketing of the savings-investment problem; the dynamic role of productive capital investment in achieving and maintaining full employment. *Prerequisite:* Principles of economics or a general course in marketing or the equivalent.

Main topics in the course will be covered by guest lecturers, from industry and Government, such as: James V. Allfrend, Jr., Principal Budget Examiner, Bureau of the Budget; Arthur A. Hood, Director of Dealer Relations, Johns-Manville Sales Corporation; Samuel H. Thompson, Special Assistant, Office of the Secretary, Department of Commerce.

#### Seminar in Marketing

(See p. 95)

#### RESEARCH IN SOCIAL SCIENCES

#### Measurements of Economic Activity

(See p. 87)

#### 712. Research Methods in Social Sciences

Spring, 2 credits

MORDECAI EZEKIEL

Designed primarily for the economist and economic statistician who is engaged in economic and statistical research. The aim is to acquaint the students with the application of the basic principles of scientific method to concrete research problems and also with the art of preparing written reports embodying the results of their investigations. *Prerequisite:* Advanced training in economics or statistics or equivalent experience subject to approval of the instructor.

#### Statistics of the Federal Government

(See p. 39)

#### Modern Developments in Statistical Economics

(See p. 41)

[713.] **Quantitative Approach to General Equilibrium and Economic Forecasting** (1947-48 and alternate years)

**Research Methods in Radio Programs** (See p. 39)

**717. Interview Survey Techniques in the Social Sciences**

Spring, 2 credits

DWIGHT W. CHAPMAN

The basic methods of making interview surveys to secure accurate data from respondents with regard to their attitudes and opinions, their economic and related behavior, and the information they possess on the problem being studied. Consideration is given also to market research, polls, and other types of surveys. Also included is a study of survey planning, formulation of hypotheses, questionnaire construction, methods of coding, and analysis. *Prerequisite:* A course in general psychology and one in statistics.

**Sampling in Social and Economic Surveys** (See p. 40)

**Division of Economic and Social Policy**

COMMITTEE ON ECONOMIC AND SOCIAL POLICY

**HOWARD R. TOLLEY**, B.S., Chief Economist and Director of the Division of Economics and Marketing, Food and Agriculture Organization of the United Nations (Chairman)

**RAY BLOUGH**, Ph.D., Assistant to the Secretary of the Treasury

**LEWIS L. LORWIN**, Ph.D., Chief, Economic Program Staff, Office of International Trade Operations, Department of Commerce

**HOWARD B. BOYD**, Ph.D., Director of Price, Production and Marketing Administration, USDA

**JAMES G. MADDOX**

**WILLIAM A. MINOR**, B.S.A., Assistant to the Secretary of Agriculture

**GERHARD COLM**, Dr.rer.pol., Chief, Fiscal Division, Bureau of the Budget

**JOHN H. G. PIERSON**, Ph.D., Consultant on Post-war Employment Policy, Bureau of Labor Statistics, Department of Labor

**I. S. FALK**, Ph.D., Director, Bureau of Research and Statistics, Social Security Board, Federal Security Agency

**EDWARD I. KOTOK**, M.S.F., Assistant Chief, Forest Service, USDA

**204. Current Policy Problems of American Agriculture**

Fall, 1 credit

T. ROY REID and SPECIAL LECTURERS

A lecture course designed to give clerical and junior professional personnel a review of some of the major problems of American agriculture. Conditions giving rise to these problems will be surveyed and current proposals for meeting them will be critically studied. Outstanding men from both the executive and legislative branches of the Government and from outside the Federal service will participate in the lectures.

**History of Engineering**

(See p. 122)

**Introduction to Economics, Theory and Institution**

(See p. 85)

**407. History of Agricultural Policy in the United States Since the Colonial Period**

Year, 2 credits each semester

EVERETT E. EDWARDS

An introductory historical survey of agricultural policies in the United States; the relation of agricultural policy to the main currents of American thought; the principal forces shaping agricultural policies in past periods; and

the inter-relationships among agricultural and other economic and social policies.

### 423. Rural Social Policies in the U. S. and Other Countries

Fall, 2 credits

WILBUR J. COHEN

Description and comparison of the policies of the United States and a selected group of other countries such as Great Britain, France, New Zealand and Chile with respect to social security and health measures, including unemployment, old age and health insurance, and family allowances; housing programs; special nutritional programs; minimum wage laws; and similar welfare policies. *Prerequisite:* Principles of sociology, or principles of economics, or equivalent training and experience.

### 408. Economics of Contemporary Policies

Year, 2 credits each semester

JAMES G. MADDOX

Aimed at equipping students with the elementary analytical techniques necessary for understanding and evaluating the major trends in contemporary economic policy. Attention is given to the economic principles underlying Government action in such fields as stabilization, unemployment, monopolistic practices, and international collaboration. *Prerequisite:* Principles of economics or equivalent training and experience.

### 716. Seminar in Economic and Social Implications of Current Agricultural Policies

Fall, 2 credits

WILLIAM A. MINOR, ROBERT H. SHIELDS

Designed to bring before students some of the outstanding economists of the country with from one-third to one-half of the meetings led by guest instructors. The seminar is devoted to a continuing analysis and evaluation of the major components of current agricultural policies. *Prerequisite:* Master's degree in economics or permission of the instructor.

### Seminar in National and International Policies Affecting Agriculture (See p. 98)

### 717. Seminar in Agricultural Price and Income Policy (alternate years)

Spring, 3 credits

ORIS V. WELLS

This seminar fully explores and evaluates various price and income policies and problems involved in developing sound policies in these fields. *Prerequisite:* Master's degree in economics or permission of instructor.

### 718. Seminar in Rural Social Policies

Spring, 2 credits

T. J. WOOFTER, JR.

This seminar analyzes and evaluates Government welfare policies in the United States and other countries. Attention is centered primarily on such measures as social security for rural people, rural housing programs, measures aimed at improving health and medical facilities in rural areas, tenure, improvement, and similar welfare programs. Emphasis is given to the need for and the economic effects of policies of this general nature. *Prerequisite:* Master's degree in economics or sociology or permission of the instructor.

### 719. Seminar in Policy Problems in Resource Utilization, Development and Conservation

Year, 2 credits each semester  
(First year of a two-year seminar offered every four years)

EDWARD I. KOTOK  
V. WEBSTER JOHNSON  
MARK L. NICHOLS

The outline for this two-year seminar has been developed by a committee of staff members from Forest Service, Bureau of Agricultural Economics and

Soil Conservation Service. The committee, which also furnishes leadership for the seminar, draws upon qualified personnel from various agencies of the Government to aid in concluding the seminar. *Prerequisite:* Graduate study or responsible work in related fields or permission of the committee.

## DIVISION OF AGRICULTURAL ECONOMICS

### COMMITTEE ON AGRICULTURAL ECONOMICS

SHERMAN E. JOHNSON (Chairman)

HAROLD HEDGES, M.A., Head, Cooperative Research Division, Farm Credit Administration, USDA

HAROLD B. ROWE  
J. MURRAY THOMPSON

ORIS V. WELLS, B.S., Chief, Bureau of Agricultural Economics, USDA

BENNETT S. WHITE, Ph.D., Assistant Head, Division of Statistical and Historical Research, Bureau of Agricultural Economics, USDA

### [205.] Introduction to Farming

### 206. Federal Crop Insurance

Fall, 1 credit

WILLIAM H. ROWE, M. ELDON COLBY

This course consists of lectures and discussions covering the various phases of crop insurance. The lectures are given by various persons and coordinated by the instructor. Material covered includes a study of crop losses and the need for insurance, crop insurance in foreign countries, early crop insurance by private companies in the United States, principles underlying the program, methods of operation, actuarial methods, insurance experience, problems encountered and new developments.

### 207. Economics of Farm Production

Fall, 3 credits

WINN F. FINNER

Designed to develop the economic principles of farm production and to relate these principles to practical farm problems; also brief surveys of types of farming, land tenure and ways of measuring economic success in farming. *Prerequisite:* Principles of economics or equivalent.

**Economics of Marketing** (See p. 89)

**Market Analysis** (See p. 90)

**Marketing Consumer Goods** (See p. 90)

**Marketing from Consumer's Point of View** (See p. 88)

### [209.] Economic Geography of the United States (1947-48 and alternate years)

### 409. Farm Management (alternate years)

Year, 2 credits each semester

WYLIE D. GOODSELL assisted by CARL P. HEISIG and H. L. STEWART

An advanced course in farm organization and management which combines development of economic principles of farm production with application to the planning and operation of farms of different sizes, types and locations. Consideration is also given to economic adjustments needed in specific farming areas and for the nation. *Prerequisite:* Economics of Farm Production, or equivalent.

<b>Managing Personal Finances</b>	(See p. 88)
<b>New Developments in Animal Breeding</b>	(See p. 18)
<b>Advances in Plant Breeding</b>	(See p. 18)
<b>Advances in Insecticides and Fungicides</b>	(See p. 18)
<b>Agricultural Engineering Orientation</b>	(See p. 109)

### **695. Extension Thesis**

Fall, 6 credits when approved. Repeated in Spring

M. C. WILSON

An opportunity will be afforded to qualified persons who desire to undertake a study of an agricultural extension problem and to submit a thesis. The amount of credit, to be determined by a thesis committee, will be based upon the nature of the problem, amount of work, and quality of the thesis.

### **596. Extension Education**

Fall, 6 credits. Repeated in Spring

FREDERICK P. FRUTCHEY

This course is designed for students from other countries who are studying Extension work. The origin, purposes, and organization of Extension work are discussed, as well as steps in program building, Extension methods, local voluntary leadership, supervision and measuring results. Principles of education, psychology and sociology are explained. *Prerequisite:* Open only to foreign interns in the Department of Agriculture.

**[410.] Land Economics (1947-48 and alternate years)**

### **411. Agricultural Finance**

Fall, 3 credits

DONALD C. HORTON

Appraisal of the credit needs of agriculture for both production and marketing; sources of credit and their adequacy; budgetary principles and procedures; analysis of risk factors; credit instruments and their utilization. *Prerequisite:* Economics of Farm Production, or equivalent.

### **412. Risk and Insurance**

Spring, 3 credits

WILLIAM H. ROWE

Consideration of the risk problems encountered in agriculture, present methods of risk bearing, appraisal of suggested new methods of covering the physical and economic risks encountered in farming. *Prerequisite:* Economics of Farm Production, or equivalent.

**[413.] Land Appraisal (1947-48 and every third year)**

**[208.] Farm Business Law (1947-48 and alternate years)**

**Business Law**

(See p. 78)

**[414.] Market Organization for Production of Marketing Services**

**[415.] Market Structure and Price Determination**

**416. Agricultural Cooperation**

Fall, 3 credits

JOHN DAVIS, HAROLD HEDGES, RAYMOND W. MILLER

Discussion of the philosophy and economic concepts of the farmer cooperative movement; a review of its history and development; analysis of legal phases and of organizational and financial structures; evaluation of major cooperative developments in the fields of marketing, purchasing and farm services; and appraisal of its future role in American agriculture. *Prerequisite:* Economics of Marketing or equivalent.

**[417.] Domestic Trade Barriers****720. Seminar in Economics of Production (alternate years)**

Spring, 3 credits

SHERMAN E. JOHNSON and ASSISTANTS

A seminar dealing with special problems in the broad field of economics of production. Students will be expected to prepare papers on problems of interest in their special fields. Different research workers and administrators participate in the discussion of current problems under the guidance and coordination of the instructor. *Prerequisite:* Background of graduate work and approval of instructor.

**Seminar in Work Measurement and Production Standards**  
(See p. 70)**Economic and Social Implications of Current Agricultural Policies**  
(See p. 92)**Design and Analysis of Complex Experiments**  
(See p. 39)**721. Seminar in Agricultural Finance**

Spring, 3 credits

NORMAN J. WALL, RUSSELL C. ENGBERG

A seminar dealing with the policies, programs and functions of private, quasi-public and public credit agencies; appraisal how adequately credit needs are being met; new developments in financing agricultural production and marketing. *Prerequisite:* Background of graduate work and approval of instructor.

**Monetary and Employment Theories**  
(See p. 87)**722. Seminar in Marketing (alternate years)**

Spring, 3 credits

FREDERICK V. WAUGH

A seminar for advanced students professionally interested in the organization of markets and market agencies (firms) in relation to adequacy of service, efficiency and costs. Chief emphasis will be placed upon application of analytical methods of economics, accounting and statistics to important problems and policy questions in this field. Credit will be awarded on the basis of papers submitted on the special subjects approved at time of registration. *Prerequisite:* Registration upon instructor's approval of topic selected by the student for special study.

**Seminar in Agricultural Price and Income Policy** (See p. 92)**[723.] Seminar in Administration and Implementation of Agricultural Programs**

## DIVISION OF INTERNATIONAL RELATIONS

## COMMITTEE ON INTERNATIONAL POLICIES AND PROBLEMS

DUNCAN HALL, B.Litt., Director of British Official Histories, British Civil Secretariat (Chairman)

CHARLES BUNN, LL.B., Adviser, Office of International Trade Policy, Department of State

WILLIAM D. JOHNSTONE, JR., Ph.D., Dean, School of Government, George Washington University

HAROLD LASWELL, Ph.D., Consultant, Office of Assistant Secretary Benton, Department of State; Yale Law School

WALTER H. C. LAVES, Ph.D., Administrative Consultant on International Affairs, Bureau of the Budget

EGON RANSHOFEN-WERTHEIMER, Consultant, Division of International Organization Affairs, Department of State; Carnegie Endowment

LEWIS H. ROHRBAUGH, Ph.D., Director, Graduate School, USDA

GEORGE L. RIDGEWAY, B.Litt., Director of Economic Research, International Business Machines Corporation, New York

LESLIE A. WHEELER, M.B.A., Director, Office of Foreign Agricultural Relations, USDA

CLAYTON E. WHIPPLE, M.S., Head Agricultural Economist, Office of Foreign Agricultural Relations, USDA

FRANCIS O. WILCOX, Ph.D., Head International Relations Analyst, Library of Congress

## 427. International Political Psychology

Fall, 3 credits

NATHAN LEITES

The units of international relations: persons, groups, attitudes, institutions. The plasticity and rigidity of human nature. How persons become identified with one another. Some political identifications: nation, humanity, race, economic class. Political expectations: of violence, of peaceful change. Political demands: independence, supremacy, equality, security. The psychological technique of international conference and cooperation; of insecurity reduction.

## 428. World Politics

Spring, 3 credits

H. M. SPITZER

Structure of state system; nationality; sovereignty as the maximum area of agreement. "We the peoples of the United Nations." Conditions of peace and causes of war (conflicts of will, interests and ideas; desires for things incompatible with peace; political, economic and ideological aggressions; insecurity, etc.). State and private struggle for power on the economic plane. Raw materials, population, agriculture and food. Diplomacy; military organization; ideological manipulations (political and psychological warfare by use of channels of communications, such as speech, press, radio, etc.); attempts to maintain peace and reasons for failure. Facilitating international cooperation, political, economic, cultural; and mitigating conflict by means of international institutions, public and private.

## [429.] World Social Structure (1947-48 and alternate years)

## 724. Problems and Machinery of World Organization

Year, 2 credits each semester

H. M. SPITZER

Pre-history. The public international unions and bureaus. The League system (including International Labour Organization and Permanent Court). The United Nations Charter, comparison with the League system; analysis of structure and functions. The role of the principal organs of U.N. The specialized international agencies in operation and in the planning stage: UNRRA, FAO, International Fund and Bank, PICAO, UNESCO; projects for international agencies on trade and health. Interrelation between the United Nations and the specialized (functional) agencies. Problem of relationship between public and non-official international organizations (e.g. World Federation Trade Unions). Regionalism in international organization, relationship between general and regional agencies (Pan-American Union, European Inland Transport Organization, etc.). International territorial administration. The League and

United Nations, and the British Commonwealth types of organization, versus the world federal concept (world government). *Prerequisite:* General background in one of the social sciences or the equivalent as approved by the instructor.

**[725.] Seminar in the Practice and Technique of International Administration** (1947-48 and alternate years)

**[726.] Legal Aspects of International Relations** (1947-48 and alternate years)

**Labor and Social Legislation Abroad** *(See p. 89)*

**727. Seminar in Problems of National Defense and of the Prevention of War**

Year, 2 credits each semester

STEFAN T. POSSONY

Air, land and sea power. Tactical trends and strategic changes. Relation of national and international security in the light of two world wars and of Covenant and Charter. National defense policies and the foundations of national power. Problems of industrial mobilization in the light of 1917-18, 1941-45, and of new technical developments. Plans for international limitation and control of armaments. Work of the U.N. Security Council and Atomic Committee. The purpose of the course will be to get a common view of policies and problems as seen from the different angles of the national agencies dealing with foreign affairs and defense. *Prerequisite:* M.A. or consent of instructor.

**528. International Financial and Trade Policies**

Fall, 2 credits

OSCAR ZAGLITS

The course analyzes patterns and problems of international commercial and financial policy. Discussion of the arguments for and against free trade is combined with analysis of the economic effects of the various forms of government intervention in international trade and finance, such as: import and export tariffs, tariff preferences, quotas and other quantitative trade restrictions, currency manipulations, and exchange controls. Particular attention is given to the efforts now underway to restore international monetary stability and promote the expansion of world trade and employment; and to the general character and tasks of the international institutions dealing with these problems. *Prerequisite:* A course in principles of economics or equivalent.

**728. Seminar in International Financial and Trade Policies**

Spring, 2 credits

OSCAR ZAGLITS

The seminar is designed to discuss, at an advanced level, (1) current international economic problems and policies; and (2) specific objectives, organizational structure and prospective policies of such existing or proposed institutions as the Export-Import Bank, the new International Bank for Reconstruction and Development, the International Monetary Fund, the Food and Agriculture Organization, the proposed International Trade Organization, the Social and Economic Council of the United Nations, and agencies for the control of international commodity agreements and international buffer-stock operations. *Prerequisite:* Course 528, or equivalent graduate training.

**Economic Theory of International Trade** *(See p. 88)*

**814. World Agriculture**

Fall, 4 credits R. G. HAINSWORTH, CLARENCE M. PURVES, CLAYTON E. WHIPPLE

A survey of world agriculture including: (1) world agricultural geography, studying the influence of climate, soil and topography, density and distribution

of population with the aid of illustrative material; (2) problems of collection and analysis of statistics on world production, trade and consumption of principal crop and livestock enterprises; (3) an analysis of how countries of strategic importance including France, Germany, Italy, and the Soviet Union, China, India, Japan, Australia, Argentina, Brazil and Canada have adapted their agriculture to climatic and economic conditions. *Prerequisite:* Background work in agricultural economics or equivalent.

### 815. Seminar in National and International Policies Affecting Agriculture

Spring, 2 credits

LESLIE A. WHEELER

Comparison of national agricultural policies including U.S.A., British Commonwealth, U.S.S.R., etc.; objectives, mechanisms, results and survey of current efforts directed toward international collaboration in the agricultural field, including FAO and ITO, international commodity agreements, technical cooperation on bilateral or limited multilateral basis. Will consist of roundtable discussions under direction of leader assisted from time to time by outstanding authorities from U.S.A. and abroad, such as Sir John Boyd Orr, Director-General of the Food and Agriculture Organization of the United Nations. *Prerequisite:* Responsible administrative experience in agriculture or a related field; or a college degree or equivalent; or consent of instructor.

### Rural Social Policies in the U. S. and Other Countries

(See p. 92)

### 816. World Communications and Transport

Fall, 2 credits

WILLIAM VAN ROVEN and SPECIAL LECTURERS

The geographic and economic bases of transportation by rail, highway, boat and air, with comparisons between the efficiency of the means of transportation under different economic-geographic conditions and in various stages of development. A study of the international network of communications will be correlated with that of transportation. *Prerequisite:* Basic training in economics or equivalent responsible experience.

### [817.] The Policies and Inter-Relations of the Great Powers —USA, British Commonwealth and USSR (1947-48 and alternate years)

### 819. Non-Self-Governing Peoples and Trusteeship, National and International

Spring, 2 credits

BENJAMIN GERIG  
JAMES F. GREEN

Six centuries of political and economic, governmental and private, expansion. Expansion of Western European maritime peoples. Africa as Europe's frontier. Expansion of USSR and USA to the Pacific and across it. Expansion of Asiatic countries, China, India and Japan. Immense variety of conditions in non-self-governing territories. Problems of relations, political, cultural and economic, with indigenous peoples. Types of colonial policy, policies of assimilation and union (USSR, USA, France, past and present trends). Policies of progressive self-government or independence (British Empire, USA). Economic policies. Dependencies as markets and sources of supply in peace and war. The strategic factor, relation of dependencies to national defense and international security. Evolution of national and of international trusteeship. League Mandates and U.N. Trust Territories. *Prerequisite:* Graduate degree or equivalent responsible experience.

[820.] Seminar in American Foreign Relations, Policies and Practices (1947-48 and alternate years)

American National Government

(See p. 66)

—O—

**430. Contemporary Russia**

Fall, 2 credits. Repeated in Spring

VALERY J. TERESHENKO

Beginning with a brief summary of political, social, and cultural life in Imperial Russia, this course will place major emphasis upon Russia since the Revolution. The survey will include description of Russia's natural resources and an analysis of Soviet planned economy in relation to agriculture, industry, transportation, and distribution. Some treatment will be accorded the cultural and geographic regions of Russia with a final discussion of the role of the USSR in World War II.

[431.] Contemporary China

I-MIEN TSIANG

[432.] Contemporary Japan

JOSEPH G. YOSHIOKA

**Division of Psychology**

COMMITTEE ON PSYCHOLOGY

RENSIS LIKERT (Chairman)

ANGUS A. CAMPBELL, Ph.D., Assistant Head, Division of Program Surveys, Bureau of Agricultural Economics, USDA

CHARLES F. CANNELL, M.A., Head, Field Section, Division of Program Surveys, Bureau of Agricultural Economics, USDA

DWIGHT W. CHAPMAN, Ph.D., Assistant Director of Research Department, Washington Post

JOHN G. JENKINS, Ph.D., Head, Department of Psychology, University of Maryland

COLONEL MARION RICHARDSON, Ph.D., Expert Consultant to the Secretary of War

WILLIS C. SCHAEFFER, Ph.D., Administrative Officer, Recruitment and Placement Section, Division of Employment, Office of Personnel, USDA

—O—

**400. Psychology of Human Relations**

Fall, 2 credits

HUBERT S. COFFEY

A course in practical psychology to give students an understanding of psychology of everyday life. It includes a study of basic principles of human behavior; why people behave as they do. It is designed to help the student understand other people better. This is not the usual course in introductory psychology but is designed for students who want a general basis in practical psychology.

**International Political Psychology**

(See p. 96)

**500. Child and Adolescent Psychology**

Spring, 2 credits

(To be announced)

A course designed for those who want to understand the growth and development of children. It covers the period from infancy through adolescence and studies the physical, mental, and emotional development of the child. The course includes discussion of the process of physical and mental growth and resulting physical, social and emotional changes with particular reference to the period of puberty.

**501. Social Psychology**

Fall, 2 credits

EDGAR A. SCHULER, CARL C. TAYLOR

A general and introductory course on the social aspects of personality, social interaction and collective behavior. It includes treatments of cultural conditioning of personality, personality measurement, communication, public opinion, propaganda, censorship, mobs, riots, and social movements. *Prerequisite:* A course in general psychology or equivalent.

**502. Rural Social Psychology**

Spring, 2 credits

CARL C. TAYLOR, EDGAR A. SCHULER

A specialized course on the social psychology of rural people. Particular attention will be given to such topics as rural isolation, the reign of tradition and custom, farmers' public opinion, and farmers' movements. *Prerequisite:* A course in general psychology or equivalent.

**Tests and Measurements**

(See p. 72)

**503. The Conditions of Personality Growth**

Fall, 2 credits. Repeated in Spring

DWIGHT H. CHAPMAN

This course treats the principal factors influencing personality development: physiological bases, infantile and childhood experiences, and cultural determinants. It considers both experimental and clinical contributions to the theory of personality and the application of those to practical problems of interpreting and dealing with people. *Prerequisite:* A course in general psychology or equivalent.

**504. Personality Disorders**

Fall, 2 credits. Repeated in Spring

DWIGHT H. CHAPMAN, MARGARET IVES

This course through lectures and case discussion will deal with personality variations as seen among normal people, stressing the significance of such variation in social and occupational adjustment, and with major types of abnormal personalities with emphasis on recognition of these deviations. Designed to help meet the needs of placement officers, counselors and others who through interviews or other media must recognize and deal with problems of emotional maladjustment. *Prerequisite:* A course in general psychology or equivalent.

**505. Principles of Interviewing and Counseling (alternate years)**

Spring, 2 credits

CHARLES F. CANNELL

This course will stress the clinical approach to counseling. The application of counseling techniques to problems of personal, vocational, and job adjustment will be studied. Emphasis will be on the theory and techniques of interviewing and counseling. Will take up the psychology of adjustment as a basis for understanding and diagnosing cases. The second half of the course will be a discussion of cases. Each student will be expected to report on a counseling case. The text will be *Counseling and Psychotherapy* by Carl R. Rogers. *Prerequisite:* Counseling experience, college degree in social sciences or consent of the instructor.

**Counseling Interview Workshop**

(See p. 73)

**739. Psychological Foundations of Economics**

Fall, 2 credits

GEORGE KATONA

The purpose of the course is to study current problems of economic theory and economic policy from the point of view of the contributions psychology

made and can make to the understanding of economic behavior. The theories of Keynes, Hicks, the Stockholm group, the econometricians, etc., and policies of inflation control and stimulation of saving, investment, and employment will be analyzed in the light of psychological principles and findings.

Among the topics covered are the motives underlying economic behavior, the formation of economic decisions, the subjective factors in supply and demand, and the role of expectations. In addition to lectures, the course includes group discussions of relevant books and papers in economics and psychology. *Prerequisite:* General background in either economics or psychology.

## DIVISION OF SOCIOLOGY

### COMMITTEE ON SOCIOLOGY

**CARL C. TAYLOR**, Ph.D., Division of Farm Population and Rural Welfare, Bureau of Agricultural Economics, USDA (Chairman)

**MAJOR HAROLD DORN**, Ph.D., Director, Medical Statistics Division, Surgeon General's Office, War Department

**JOHN PROVINSE**

**SAMUEL STAUFFER**, Ph.D., Professor of Sociology, University of Chicago

**CONRAD TAEUBER**, Ph.D., Special Assistant to Chief, Bureau of Agricultural Economics, USDA

**CAROLINE WARE**, Ph.D., Professor of Sociology, Howard University

**OSCAR WEIGERT**, Jur.D., Labor Economist, Staff on Foreign Labor Conditions, Bureau of Labor Statistics, Department of Labor

### 215. General Sociology

Fall, 3 credits

ARTHUR F. RAPER

A basic and general study of social problems and processes with special emphasis upon such problems as population, race, poverty, crime, divorce, etc., and with special emphasis upon group processes such as organization, leadership, public opinion, etc.

### Rural Social Psychology

(See p. 100)

### 506. Principles of Rural-Urban Sociology

Spring, 2 credits

NELS ANDERSON

A comparative study of rural and urban community life; of differences and interrelations between rural and urban cultures; of the influence each of these cultures may have upon the other, with special emphasis on rural and urban problems in the United States. *Prerequisite:* One course in sociology.

### 507. Farm Labor and Tenure Problems

Fall, 2 credits

LOUIS J. DUCOFF, JOHN F. TIMMONS

Survey of the comparative social and economic conditions of farm laborers, sharecroppers, tenants and owner-operators, and their roles in American agriculture. Farm labor problems are reviewed against a background of war and prewar agricultural employment and wage conditions, with special attention to occupational mobility. Farm tenure problems are considered in terms of insecurity of tenure, absence of legal safeguards, low incomes, and the functioning of "the agricultural ladder." Possible measures for amelioration of farm labor and tenure problems are reviewed. *Prerequisite:* One course in economics or sociology.

### 508. Agricultural Employment and Wages

Spring, 2 credits

LOUIS J. DUCOFF

A systematic treatment of patterns and trends in agricultural employment and wages with special attention to regional variations and agricultural-industrial interrelationships. Among the subjects covered will be problems of measurement of agricultural employment, the composition of the farm working force,

agricultural wage structure and factors affecting wage levels, farm-nonfarm wage and income differentials, migration and the farm labor supply, problems of underemployment and implications for full employment policies. *Prerequisite:* One of following—one course in economics; Farm Labor and Tenure Problems; or consent of instructor.

### Standards of Living

(See p. 89)

### 509. La America Latina y los Estados Unidos

Year, 2 credits each semester

PHILIP L. GREEN

Lectures and discussions in Spanish. This course provides an opportunity to achieve greater facility in Spanish, while acquiring useful and interesting information on the life of the Latin-American countries and their relations with the United States. The first semester analyzes racial, geographic, economic, and political forces that have shaped Latin-American development; and surveys important contributions of Latin-American literature, art, music, social legislation and other spheres of human activity. The second semester embraces fundamental trends and influences for and against inter-American friendship, from earliest times to the present day. It describes official and non-governmental inter-American relations, presents problems and indicates opportunities facing the Americas today. *Prerequisite:* Registration is limited to students who have had the requisite instruction and practice in Spanish. Those who are in doubt as to their adequacy in this regard are advised to confer with the instructor before registering.

### 510. Population

Fall, 3 credits

CONRAD TAEUBER assisted by  
IRENE B. TAEUBER, PHILIP M. HAUSER

Changing growth, distribution and composition of world population; the United States within a world setting; the people of the United States today—number, distribution, social economic and national composition; birth rates, death rates, and natural increase; international migration; internal migration, and movement within both rural and urban areas; the impact of the war on the American population; the future population of the United States; social and economic aspects of population growth; population policies, implicit and explicit. *Prerequisite:* One course in sociology, or equivalent as approved by instructor.

### 511. Population Research Methods and Analysis

Spring, 2 credits

MARGARET HAGOOD

Methods of computing basic demographic rates, including standardized birth and death rates and measures of mortality and fertility based on life tables, migration rates, labor force participation rates; methods of analysis of composition characteristics of populations and dynamics of population in relation to other factors; methods of developing adjustments for noncomparability, incompleteness or other inadequacies of population data, and of computing approximate or substitute rates. *Prerequisite:* Course 510 or the equivalent.

### [512.] Culture of Contemporary American Rural Life

### [513.] Contemporary National Cultures

### 514. The Social Problems of Administration

Spring, 3 credits

JOHN PROVINSE

Deals with the social, cultural and psychological processes and groups which operate within administration, especially the administration of industries and government. It deals with the influence of previous social status and social conditioning upon persons operating within administration, and with sub-non-

structural groups which operate within all administrative groups. It is not a course in administration or administrative efficiency, but a course in the sociology of administration. *Prerequisite:* Responsible administrative experience.

### 515. Rural Organization and Group Action

Fall, 3 credits

DOUGLAS ENSMINGER

A study of the types of rural organization, patterns of association, leadership, and processes by which farm people meet their problems. It also analyzes the way all agencies which seek to serve farm people organize and relate their programs to the existing patterns of organization. Case material in group action is utilized in developing principles of organization and leadership. *Prerequisite:* One course in social science.

### [740.] Seminar in Rural Organization

DOUGLAS ENSMINGER

### 516. The Cultural Regions of the United States

Fall, 3 credits

CARL C. TAYLOR, ARTHUR F. RAPER

This course is a study of the cultural regions of the United States covering in detail the characteristics of the various regions and subregions and their inter-relationships, including settlement patterns, social organizations and institutions, prevailing ideologies, modes and folkways, and dominant attitudes and opinions of the people who live in the rural areas of these cultural regions. *Prerequisite:* Two courses in social science.

## DIVISION OF COMMUNICATIONS AND TRANSPORTATION

### COMMUNICATIONS

### 338. Regulation of Communication

Fall, 2 credits

WALTER B. EMERY

General factors (technical, social, political, economic, etc.) which brought about need for Government regulation of radio and other forms of communication; review of provisions of Congressional Acts of 1910, 1912, 1927 and 1937 and proceedings and accomplishments of national and international conference as well as Congressional hearings; functions and organizational structure of FCC, its relation to other federal agencies, to Congress and the general public; factors and procedures involved in application for radio station; qualifications of applicants, standards imposed by law and by FCC rules and regulations as to operation of various types of stations (standard, FM, television, facsimile, experimental, etc.); general requirements to be met by all licensees in light of "public interest, convenience and necessity"; programming problems in terms of public needs; modification, renewal and revocation of licenses; special rules for network-affiliated stations; significant FCC and Court decisions on radio; review of recent developments in radio and analysis of problems of social control. Course primarily for those interested in studying regulations of communications, those actively engaged in operations, such as station managers and program directors, and professional persons wishing to learn more of rules and regulations relative to radio.

### Imperfect Competition and Public Regulation

(See p. 86)

### 605. Communications in Society

Year, 2 credits each semester \*

DALLAS W. SMYTHE

The course will integrate the economic, political and psychological aspects of communications in our society. The first semester will cover telephone and

\* This course is so arranged that students may attend both semesters or either semester. No subject matter, however, will be repeated.

telegraph (both by wire and radio) and the various forms of radio broadcasting including FM and television, as well as the applications of radio for safety of life and property in transportation, protective services, etc. Each semester will include a description of the present system in the United States; an historical survey of the development of the system including the growth of the organizational and theoretical basis of regulation by Federal and State agencies; an analysis of the availability of communications service and of the economic, technical and other factors limiting such availability; a comparative analysis of the methods of organization and scope of communications facilities in other countries; a survey of the problems of international communications in their political and economic setting; and consideration of the possible consequences of the trend toward elimination of the space barrier to communications. Lectures, outside reading, discussion and preparation of independent papers. *Prerequisite:* General courses in economics, modern history, and political science.

**Transmission and Distribution Systems for Area Electrification** *(See p. 109)*

**World Communications and Transport** *(See p. 98)*

**Research Methods in Radio Programs** *(See p. 39)*

**TRANSPORTATION**

**COMMITTEE ON TRANSPORTATION**

**HAMPTON K. SNELL**, Ph.D., Assistant to Vice-President, Department of Research, Association of American Railroads (Chairman)

**RUSSELL B. ADAMS**, Director, Economic Bureau, Civil Aeronautics Board

**FORD EDWARDS**, Ph.D., Head Cost Analyst, Interstate Commerce Commission

**SIDNEY L. MILLER**, Ph.D., Professor of Transportation, University of Pittsburgh

**FREDERICK L. THOMSEN**, Ph.D., Head, Division of Marketing and Transportation Research, Bureau of Agricultural Economics, USDA

**J. C. WINTER**, Chief, Transportation Facilities Division, Marketing Facilities Division, Production and Marketing Administration, USDA

—O—

The transportation industries and facilities constitute an extremely important part of the economic organization of the United States, involving an investment of probably more than 60 billion dollars and requiring more than two million employees. The railroads account for more than 60 per cent of the employees and somewhat less than one-half of the investment; public highways alone account for more than half of the total investment. About 15 per cent of employees work in water transport and another 15 per cent in intercity trucks and buses. City transport and the rapidly growing airlines account for the remainder.

The majority of "white-collar" workers are in traffic departments of carriers: as solicitors, clerks and rate specialists; as accountants; and in various engineering and law positions. In the Federal service most transportation work is in such agencies as: Interstate Commerce Commission, Civil Aeronautics Administration, Civil Aeronautics Board, Maritime Commission, Department of Com-

merce, Treasury Procurement, General Accounting Office, Public Roads Administration, Department of Agriculture, War Department and Navy Department; and in the specialized divisions of Justice, Interior, War Assets, and other agencies. For such employees and to others wishing to enter the field of transportation, whether in governmental or non-governmental organizations, the courses listed below, and related courses, will help to build a practical background of education and training.

—O—

### **337. Principles of Transportation**

Fall, 3 credits

HAMPTON K. SNELL

Characteristics and economic principles of railway, highway, waterway, and air transportation. Transportation geography and principal commodity movements of the United States. Freight and passenger rate principles. Varieties of competition, cooperation, consolidation, coordination. Transportation labor relations and financial problems. Interstate Commerce Act; principles of inter-state and intra-state regulation of railway, highway, waterway, and air transportation. Sources and interpretation of transportation data and information particularly for Government employees.

### **601. Traffic Management**

Fall, 3 credits

JAMES F. PERRIN

Designed to acquaint transportation students with the principles and practices of traffic management from both Governmental and commercial points of view. Emphasis on functions of a traffic department, both industrial and Governmental, and on relations between carriers and traffic departments, with a considerable portion of the emphasis placed on transportation law. *Prerequisite:* Experience with rates and structures.

### **602. Traffic Management—Rates and Rate Determination**

Spring, 3 credits

ABBEFORD S. DOLCH

Use of traffic documents; commodity classification; rate principles and determinations; tariffs and traffic publications for the several forms of transportation. Review and analysis of traffic files and materials. *Prerequisite:* Course 601 or experience with rates and structures.

### **651. Commercial Air Transportation**

Fall, 3 credits

MYLES E. ROBINSON

A practical course in the organization, services, charges and regulations of domestic and international air transportation. It includes the study of the development of aviation and air transportation, air mail, express, cargo and passenger traffic and charges; also the aid and development of commercial air transportation and Government regulation of air carriers. *Prerequisite:* Principles of economics, or equivalent as approved by instructor.

**[603.] Highway and City Transportation (1947-48 and every third year)**

**[604.] Water Transportation (1948-49 and every third year)**

# Department of Technology

## DEPARTMENTAL COMMITTEE

F. J. SETTE, M.S., Special Assistant Director, Bureau of Reconversion Priorities, Civilian Production Administration (Chairman).

THOMAS B. CHAMBERS, C.E., Chief, Engineering Division, Soil Conservation Service, USDA

R. G. HAINSWORTH, M.A., Principal Economic Geographer, Office of Foreign Agricultural Relations, USDA

WILLIS S. MACLEOD, I.M.E., Acting Deputy Director, Standards Branch, Procurement Division, Treasury Department

WILLIAM R. OSCOO, Ph.D., Mechanical Engineer, Structural Mechanics Division, David Taylor Model Basin, Navy Department

ROBERT W. TRULLINGER, B.S., Assistant Chief, Office of Experiment Stations, Agricultural Research Administration, USDA

GILBERT S. UNDERWOOD, M.A., Supervising Architect, Public Buildings Administration, Federal Security Agency

FAYETTE S. WARNER, Ph.D., Engineer-Economist, Federal Power Commission

MARSHALL S. WRIGHT, Technical Assistant to the Chief, Office of Plant and Operations, USDA

## ENGINEERING SOCIETIES COMMITTEE

COMDR. K. T. ADAMS, B.S., American Society of Photogrammetry

HENRY W. AUSTIN, M.E., American Association of Engineers

COMDR. JAMES J. BOWE, M.E., D. C. Society of Professional Engineers, Inc.

FREDERICK M. FEIKER, E.E., Washington Society of Engineers

CHARLES E. JACOB, M.S., American Society of Civil Engineers

W. J. LYNNETT, E.E., National Society of Professional Engineers

RUDOLPH MICHEL, M.S., American Society of Mechanical Engineers

A. L. SHALOWITZ, LL.M., American Congress on Surveying and Mapping

ARTHUR W. TURNER, B.E., American Society of Agricultural Engineers

F. M. WALTERS, JR., Ph.D., American Society for Metals

## GOVERNMENT AGENCIES COMMITTEE

ALBERT F. BROWN, B.S., Assistant Chief, Training Division, Departmental Civilian Personnel, Navy Department

PARMELY C. DANIELS, M.A., Personnel Officer, National Advisory Committee for Aero-nautics

JOHN C. GREEN, LL.B., Director, Office of De-classification and Technical Services, Department of Commerce

JOHN E. HANSBURY, B.S., Assistant Head Valuation Engineer, Bureau of Valuation, Interstate Commerce Commission

FRED E. LEVI, M.S., Executive Assistant, Administrative Management Division, Bureau of the Budget

GOODRICH W. LINEWEAVER, Director, Branch of Operation and Maintenance, Bureau of Reclamation, Department of Interior

CARTER MCFARLAND, Ph.D., Agency Training Officer, National Housing Agency

WILLIS MACLEOD, ARTHUR P. MILLER, C.E., Senior Sanitary Engineer, U. S. Public Health Service, Federal Security Agency

W. N. REHLAENDER, Director of Personnel, Federal Works Agency

W. E. SPOFFORD, Technical Consultant, U. S. Maritime Commission

E. J. STOCKING, M.S., Assistant Chief, Examining and Personnel Utilization Division, Civil Service Commission

ARTHUR W. TURNER, B.S., Assistant Chief in Charge of Agricultural Engineering, Bureau of Plant Industry, Soils and Agricultural Engineering, Agricultural Research Administration, USDA

## COMMITTEE ON AGRICULTURAL ENGINEERING

ARTHUR W. TURNER (Chairman)

THOMAS B. CHAMBERS (Alternate)

CARL A. JOHNSON, B.S., Chief Engineer, Farm Security Administration, USDA

COVINGTON G. KILBOURNE, E.E., Head, Steam Plants Unit, Engineering Division, Rural Electrification Administration, USDA

WILLIAM K. KNAUFF, Chief, Equipment and Engineering Services Division, Office of Plant and Operations, USDA

CHARLES A. LOGAN, M.S., Superintendent, Office of Operations, Agricultural Research Center, Agricultural Research Administration, USDA

SAMUEL P. LYLE, M.S., In Charge, Agricultural Section, Extension Service, USDA

Ross E. MOORE, Ph.D., Chief, Technical Collaboration Branch, Office of Foreign Agricultural Relations, USDA

T. W. NORCROSS, M.S., Chief, Division of Engineering, Forest Service, USDA

—O—

For more than ten years, the various departments and agencies of the Federal government have been engaged in extensive pro-

grams of conserving natural resources and raising the standards of living and welfare in urban and rural areas. These programs have been translated into specific projects involving flood control, soil conservation, power development, rural electrification, industrial hygiene, housing and a number of related activities. Preparation for defense and later production for war involved expansion of the existing industrial plant and, when access to raw materials was prohibited by enemy action, the development of new facilities for the manufacture of substitute materials. All these governmental actions have involved in varying degrees engineering techniques and engineering personnel.

The complexity of modern society underpinned by an elaborated and interdependent industrial organization requires higher levels of awareness and imposes greater responsibilities upon executives and administrators. Criticisms have been made of engineers that they are insensitive, as a group, to their social and economic environment; that they fail to perceive the social consequences of technological advances for which they have been largely responsible; and that they have failed to provide necessary social mechanisms calculated to minimize the consequent dislocations. On the part of engineers, there is a feeling that there is a "glaring disproportion between the role which the engineer plays in providing and maintaining the basis of modern civilization, and the influence which he exercises over the shaping and directing of public affairs." \*

Basically, education in engineering schools, limited by necessity and tradition to a period of four years, is mainly technical. In this short period, barely sufficient to assimilate and master a minimum of the basic sciences, there is little room for courses to supply the engineering student with background in the social and economic world about him so that he may understand the impact of the advances of his profession upon society. Moreover, developments in the sciences and in engineering require enlarging of the engineer's technical background.

Mindful of these limitations of engineering education and of the engineer's place in modern society, the Graduate School, working together with representatives of the various Government departments and of the local chapters of engineering societies, proposes to offer recommended courses intended to add to the technical, administrative and professional background of engineers in the service of the Federal government. The range and variety of engineering, scientific, economic and social work of the Government and

\* "Science and Engineering"—Boris A. Bakhmeteff, *Civil Engineering*, March, 1946.

the concentration of professional skills in the various agencies afford an almost unlimited reservoir of talent from which to draw lecturers required to offer courses requested by young engineers. In fact the potentialities in subject matter are limited only by the interest of the engineers. The Department of Technology is prepared to recommend courses which it feels will assist the development of the young engineer and the applied scientist. Some of these courses will be of experimental nature, the continuance of which will depend upon their usefulness in supplying the needs of the engineer in the Government service. The committees are at work on a possible plan to offer certificates of achievement in Technology, with concentration in a major field, such as are offered in other departments.

—O—

*Course Numbers and Symbols*—Below 100, non-credit; 100-399, undergraduate; 400-699, graduate and advanced undergraduate (senior); above 699, graduate. Bracketed numbers, not given this year.

—O—

### DIVISION OF ENGINEERING

THOMAS B. CHAMBERS (Chairman)

#### **475. Naval Architecture**

Year, 2 credits each semester

CHARLES L. WRIGHT

First semester: Determination of principal dimensions of a ship; development of ship lines; displacement and stability calculations; launching.

Second semester: Trochoidal wave theory; action of ships in waves; hull form and resistance; power; propulsion, steering.

*Prerequisite:* Completion of junior year in a school of engineering or equivalent experience.

#### **476. Ship Construction**

Year, 2 credits each semester

CHARLES L. WRIGHT

First semester: Shipyard organization; calculations of weight and strength of ships; riveted and welded construction; design of structural parts.

Second semester: Arrangement of machinery and fittings; piping, wiring, and ventilation; load line regulations, tonnage measurement, trial trips, dry docks.

*Prerequisite:* Completion of junior year in a school of engineering or equivalent experience.

#### **Theory of Modern Architecture**

(See p. 117)

#### **[200.] Introduction to Radio Communication**

#### **[400.] Principles of Radio Engineering**

#### **401. Pumping for Drainage and Irrigation**

Fall, 2 credits

JOHN G. SUTTON

General application of pumping installations to drainage and irrigation; efficiencies and operating characteristics of various types of pumps, pipes, power

units, transmissions, pumping plant installations; pumping from wells; auxiliary equipment; costs of pumping. Lectures and laboratory work. *Prerequisite:* Completion of junior year in a school of engineering or equivalent experience.

### 402. Principles of Refrigeration

Fall, 2 credits

HARRY GARVER

Elementary course including: characteristics of refrigeration; types of mechanical equipment and installations, power used, controls, evaporation coils, insulation, heat conductivities, management of eutectics; practical applications; refrigeration requirements for different foods; and study of refrigeration installations. *Prerequisite:* Physics, algebra, trigonometry, analytic geometry, or equivalent.

### 403. Principles of Air Conditioning

Spring, 2 credits

R. S. DILL

Different methods and processes of air conditioning as applied to homes, offices, warehouses, factories, etc. A discussion of underlying principles based on thermodynamics and mechanical engineering procedures and study of air conditioning installations. *Prerequisite:* Thermodynamics, or completion of junior year in Mechanical Engineering, or course 402 or equivalent.

### Functional House Planning

(See p. 117)

### 300. Agricultural Engineering Orientation

Spring, 1 credit

ARTHUR W. TURNER

Designed especially for returned veterans or others who have agricultural engineering training but have not been engaged in that field for some time, and for those who have had no instruction in agricultural engineering training. Definition of agricultural engineering; survey of the five fields of agricultural engineering—structures, power and machinery, soil and water conservation, rural electrification and crop processing. Special attention to important fundamental principles in agricultural engineering. Opportunities available to and problems confronting agricultural engineers.

### Farm Labor and Tenure Problems

(See p. 101)

### Hydrology

(See p. 56)

### Lecture Series in the Biological Sciences

(See p. 17)

### [500.] High Frequency Radio Transmission

### 501. Transmission and Distribution Systems for Area Electrification

Fall, 3 credits

EDWARD P. EARDLEY

Study of electrical and mechanical characteristics of lines used in the transmission and distribution of power; the operation of such system; the economic principles on which design rests. *Prerequisite:* Degree in Engineering or equivalent experience.

### Accident Prevention in the Federal Government (See p. 74)

### 700<sup>a</sup>. Analysis of Rigid Frames. First half: Fundamental Relations

Fall, 3 credits

A. AMIRIKIAN

Preliminary course covering the fundamentals of slope-deflection and the analysis of continuous beams and rectangular frames. Subjects will include:

curvature; deflection angle; deflection; conjugate beam; sign convention; fixed-end moments; slope deflection; frames without sway—direct method of solution, solution of approximations; frames involving sway—rectangular bents. *Prerequisite:* One of the following: Bachelor of Science in Civil Engineering; several years of structural design experience; experience required for an assistant engineer, P-2.

## 700<sup>b</sup>. Analysis of Rigid Frames. Second half: Methods of Application

Spring, 3 credits

A. AMIRIKIAN

Advanced course covering the analysis of complex frames of various outline, secondary stresses, and semirigid framing. Subjects will include: trapezoidal bents; vierendeel bents; gable bents; lean-to bents; hip bents; bents of irregular outline; secondary stresses; semirigid framing. *Prerequisite:* Course 700<sup>a</sup>, or equivalent.

## [701.] Electronic Control Equipment and Application (1947-48)

## 702. Electric Utility Engineering

Year, 2 credits each semester

J. J. A. JESSEL, W. J. LYNOTT, JR.

Fundamentals of electric utility engineering and their practical application to generating, transmitting, and distributing electric energy by electric utilities. Designed for engineers, engineering aids, lawyers, accountants and others who desire a broader understanding of the basic principles of electric utility engineering as applied to operating electric utilities. Subjects covered are: a general description of production, transmission, and distribution plants of electric utility, including each of the units of the property and an explanation of its functions; lectures and case studies in design and operation of electric generating stations, transmission lines and substations, and distribution substations, feeders, transformers, and services; discussions of practices followed by electric utilities in serving different classes of customers. *Prerequisite:* College degree or equivalent experience.

## Electrochemistry

(See p. 53)

## 703. Water Power Engineering

Year, 3 credits each semester

KENNETH W. ROSS and SPECIALISTS

A series of classroom exercises involving recitations, problem work, and lectures on the fundamentals of water power engineering and the important procedures necessary for their practical application. The subjects covered include precipitation, water losses, run off, stream flow, effects of storage, water power estimates, hydraulic turbines, and power plant arrangement. Application of fundamentals to development of river basins, and the characteristics governing the selection of dam and reservoir sites for various purposes. *Prerequisite:* Completion of junior year in a school of engineering, including hydraulics or physics, or equivalent experience as approved by instructor.

## Geomorphology of the United States

(See p. 54)

## 704. Fundamentals of Gas Turbines and Jet Propulsion

Fall, 2 credits

C. A. SHREEVE, JR.

Gas turbine cycles; constructional details; design and operational data; principles of rocket and jet propulsion. *Prerequisite:* B.S. degree in Mechanical Engineering, or courses in thermodynamics, analytical mechanics and strength of materials.

## Applications in Engineering Mathematics

(See p. 36)

## DIVISION OF APPLIED MECHANICS

WILLIAM R. OSGOOD (Chairman)

**706. Advanced Hydraulics**

Fall, 3 credits

GEORGE W. PATTERSON

Emphasis on the fundamental physical features underlying hydraulic phenomena encountered in engineering practice. Dimensional analysis and dynamic similarity, dimensionless numbers, Reynolds and Froude numbers. Velocity fields, principles of energy, continuity and momentum. Equations of viscous flow, laminar motion, fluid turbulence. Boundary layers. Flow in closed conduits and open channels. Resistance of immersed bodies. Wave phenomena, gravity waves in open channels. Text: Rouse, *Fluid Mechanics for Hydraulic Engineers*. Prerequisite: Hydraulics and advanced calculus, or the permission of the instructor.

**535. Hydraulics of Open Channels**

Spring, 3 credits

C. E. JACOB

Non-uniform flow in open channels. Specific-energy curve. Critical depth. States of flow. Types and properties of surface curves. Integration of varied-flow equation by stepwise approximation and by methods of Bakhmeteff and others. Application to design of canals. Hydraulics of natural channels. Stream gaging. Relations between slope, stage and discharge. Slope-area method. The energy and momentum principles in open-channel flow. The hydraulic jump. Surges and translational waves. Text: Bakhmeteff, *Hydraulics of Open Channels*. Prerequisite: Hydraulics.

**536. Ground-water Hydraulics**

Fall, 3 credits

C. E. JACOB

The theory of ground-water flow. Hydraulics of wells, collectors, and galleries. Problems of underground water supply. Artificial recharging and induced infiltration. Salt-water encroachment. Ground-water runoff and stream flow. Drainage and dewatering. Seepage through and under dams. Canal losses and other irrigation problems. Prerequisite: Hydraulics or equivalent preparation in physics.

**310. Aerodynamics**

Year, 2 credits each semester

W. E. KONECZNY

First semester: Fluid flow, wing theory, airfoil characteristics, wind-tunnel tests, stability, drag data. Lectures, discussions, and problems.

Second semester: Engine and propeller considerations, performance calculations, special problems. Prerequisite: Physics and algebra and trigonometry.

**Soil Conservation**

(See p. 54)

**301. Soil Mechanics**

Year, 3 credits each semester

EDWARD S. BARBER

Theory and practical applications of soil mechanics to the engineering problems of foundations, dams and embankments. Course designed to familiarize general engineers with problems connected with soils and methods of foundation investigation and laboratory tests available for solving these problems. Foundation investigation methods described include: core drilling, auger boring, test pit digging, record keeping and collection and protection of samples. Laboratory tests to be described include: general classification, permeability, consolidation, compaction, shear and triaxial compression. Laboratory facilities are available for demonstration. Prerequisite: College Physics.

**Principles of Physical Metallurgy**

(See p. 55)

**[530.] Introduction to Hydrodynamics****540. Theory of Elasticity**

Year, 2 credits each semester

WILLIAM R. OSGOOD

Differential equations of equilibrium of stressed elastic bodies. Conditions of compatibility. Relations between stress and strain in bodies that cannot be treated as bars, thin plates, or shells. Concentrated forces. Contact stresses. Stresses near holes, fillets, notches. Problem of stress distribution in disks, rings, hooks, wedges, thick cylinders, and spheres. Stresses in infinite half-space. Thermal stresses. Energy solutions. Text: Timoshenko, *Theory of Elasticity*. *Prerequisite:* Strength of Materials and Differential and Integral Calculus.

**541. Photoelasticity**

Spring, 3 credits

JOSEPH S. BROCK

Theory of optics of crystals as applied to two- and three-dimensional stress systems. Analysis of stress distributions by the photoelastic method. Materials, models, equipment and technique. *Prerequisite:* First semester of Theory of Elasticity.

**Advanced Optics**

(See p. 58)

**542. Mechanical Vibrations**

Year, 2 credits each semester

SAMUEL LEVY

Fundamental physical and mathematical aspects of vibration phenomena in linear and nonlinear systems. Kinematics of vibration. Single degree of freedom system without damping. Single degree of freedom system with viscous damping. Forced vibrations of single degree of freedom system. Frequency measuring instruments. Modern electrical measuring instruments. Normal modes in coupled systems. Calculation of natural frequencies and normal modes in complicated systems by use of matrices, the iteration method, and equations of finite differences. Mechanical impedance and analogy with electrical impedance. Critical speed. Dynamic loads on beams, bridges, and building frames. Impact and shock. Self excited vibration. Systems with variable or nonlinear characteristics. Text: J. P. Den Hartog, *Mechanical Vibrations*. *Prerequisite:* Engineering Mechanics.

## DIVISION OF ENGINEERING ADMINISTRATION

WILLIS MACLEOD (Chairman)

**715. Engineering Administration of Government Contracts**

Year, 3 credits each semester

WILLIAM G. HELFRICH

Course is designed primarily for engineers whose functions include obtaining of bids, making awards, drafting of contracts and specifications for construction, services and materials for the Government and the engineering administration of such contracts. It will deal with the legal significance of such functions under the general contract law, the various laws peculiar to Government contracts and the rulings of the Comptroller General's Office. The principal aim of the course is to contribute towards better engineering administration of Government contracts to the end that the Government's rights may be protected and to give the administrators a practical ability to recognize legal pitfalls. *Prerequisite:* Degree in engineering or equivalent experience.

**Introduction to Public Administration**

(See p. 66)

**Federal Administrative Management**

(See p. 67)

**The Social Problems of Administration**

(See p. 102)

<b>Office Management</b>	(See p. 45)
<b>Work Measurement and Performance Standards</b>	(See p. 69)
<b>Lecture Series in Public Administration</b>	(See p. 65)
<b>Systematic Coordination of Management Directives</b>	(See p. 48)
<b>Reporting to Top Management</b>	(See p. 67)
<b>Structure of American Business</b>	(See p. 86)
<b>Seminar in Policy Problems in Resource Utilization, Development and Conservation</b>	(See p. 92)
<b>Seminar in Economic and Social Implications of Current Agricultural Policies</b>	(See p. 92)

### 550. Contracts and Specifications

Fall, 3 credits

WILEY C. SMITH and SPECIALISTS

Contract and specification writing. Basic principles in estimating and the modernization of specification writing technique. *Prerequisite:* Completion of junior year in a school of engineering or equivalent experience.

<b>Management of Government Purchasing</b>	(See p. 76)
--	-------------

<b>Property Management</b>	(See p. 76)
----------------------------	-------------

### [551.] Practical Invention (1947-48)

### 552. Modern Engineering Materials

Spring, 2 credits

WILLIS S. MACLEOD and Special Lecturers

Selected topics reflecting modern advances in engineering materials. Designed for engineers and others interested in being brought up to date in various fields of engineering materials: metallurgy, chemicals, construction, fuels, detergents, fibers, lumber, fused silicates, adhesives, preservative coatings, mortars, insulating materials, plastics, rubber, and packaging materials. Each session consists of a lecture by an outstanding Government expert followed by general seminar-type discussion in which the lecturer is assisted by a panel of additional specialists. *Prerequisite:* College degree or equivalent experience.

Topics, lecturers and panel members are as follows:

<i>Plastics:</i> Trends Here and Abroad	Standards Branch, Procurement Division, Treasury Department
Billiard Balls to Hundred-Passenger Planes	
GORDON KLINE,* Ph.D., Chief, Organic Plastics Section, National Bureau of Standards **	WILEY C. SMITH, M.S., Chief, Chemicals Section, Specifications Division, Standards Branch, Procurement Division, Treasury Department
FRANK REINHART, B.S., Organic Plastics Section, National Bureau of Standards **	
GERALD REINSMITH, Materials Engineer, Office of the Chief of Engineers, War Department	
<i>Lubricants and Liquid Fuels:</i> Nature's Energy Conservation of Earth's Resources	<i>Rubber:</i> The Synthetics Why Rubber from Trees?
NELSON E. CARR,* B.S., Chief, Fuels and Lubricants Section, Specifications Division,	LAWRENCE A. WOOD,* Ph.D., Chief, Rubber Section, National Bureau of Standards ** E. G. HOLT, Rubber Adviser, Department of Commerce
	R. F. TENER, M.S., Senior Technologist, Division of Fibrous and Organic Materials, National Bureau of Standards **

\* Lecturer.

\*\* Department of Commerce.

**Metals:** Ferrous and Non-Ferrous Alloys and Their Uses  
 SAMUEL J. ROSENBERG,\* B.S., Metallurgist, National Bureau of Standards \*\*  
 WILLARD H. MUTCHELER, M.S., Metallurgist, National Bureau of Standards \*\*  
 G. WILLARD QUICK, B.S., Metallurgist, National Bureau of Standards \*\*

**The Fiber Family:** Animal versus Laboratory Discoveries  
 W. D. APPEL,\* B.S., Chief, Textiles Section, Division of Organic and Fibrous Materials, National Bureau of Standards \*\*  
 H. A. EHRMAN, M.S., Chief, Textiles Section, Division of Trade Standards, National Bureau of Standards \*\*  
 EVERETT L. WALLACE, B.S., Chief, Leather Section, National Bureau of Standards \*\*

**Wood:** New Materials from Trees  
 JAMES W. MEDLEY,\* B.S., Technologist, Wood Products, National Bureau of Standards \*\*  
 JAMES D. STUDLEY, M.F., Chief, Packaging Section, Specifications Division, Standards Branch, Procurement Division, Treasury Department  
 W. T. THOMASSON, Construction Materials Section, Specifications Division, Standards Branch, Procurement Division, Treasury Department

**Fused Silicates:** Vitrified Clay Products and Glass  
 The Laboratory Changes the Scope of Silica Fusion  
 R. F. GELLER,\* Chief, Ceramic Whiteware Section, National Bureau of Standards \*\*  
 C. H. HAHNER,\* M.A., Chief, Glass Section, National Bureau of Standards \*\*  
 WILLIAM N. HARRISON, M.S., Chief, Enamelled Metals Section, National Bureau of Standards \*\*  
 R. A. HEINDL, B.S., Chief, Refractories Section, National Bureau of Standards \*\*

**Adhesives:** Recent Developments Open New Fields  
 Resin, Thermoplastic and Casein Glues  
 GERALD REINSMITH,\* Materials Engineer, Office of the Chief of Engineers, War Department

FRANK REINHART, B.S., Organic Plastics Section, National Bureau of Standards \*\*  
 I. A. AARONS, B.S., Chemicals Section, Specifications Division, Standards Branch, Procurement Division, Treasury Department

**Organic Preservative Coatings:** Wider Horizons through Research  
 Coats to Make Materials Last Forever  
 WILEY C. SMITH,\* M.S., Chief, Chemicals Section, Specifications Division, Standards Branch, Procurement Division, Treasury Department

C. R. CORNTHWAITE, Materials Engineer, Office of the Chief of Ordnance, War Department  
 E. F. HICKSON, Chief, Paints Section, National Bureau of Standards \*\*

**Construction:** Materials for Modern Building Basement to Penthouse  
 ALEXANDER E. FORREST,\* B.S., Chief, Construction Materials Section, Specifications Division, Standards Branch, Procurement Division, Treasury Department  
 H. L. WHITTEMORE, Ph.D., Chief, Engineering Mechanics Section, National Bureau of Standards \*\*

**Detergents:** Soap Suds and Soapless Substitutes New Brews in Old Cauldrons  
 J. E. SIMPSON,\* Ph.D., Chief, Surface Active Materials, Research and Development Branch, National Bureau of Standards \*\*  
 F. W. SMITH, Chief, Soaps Section, National Bureau of Standards \*\*  
 I. A. AARONS, B.S., Chemicals Section, Specifications Division, Standards Branch, Procurement Division, Treasury Department

**Heat Insulating Materials:** Keeping Warm and Keeping Cool  
 RICHARD S. DILL,\* B.S., Chief, Heat Transfer Section, National Bureau of Standards \*\*  
 HENRY E. ROBINSON, B.S., Heat Transfer Section, National Bureau of Standards \*\*  
 NELSON E. CARR, B.S., Chief, Fuels and Lubricants Section, Specifications Division, Standards Branch, Procurement Division, Treasury Department

**Packaging and Packing:** Innovations and Applications  
 Getting It There in Good Condition  
 JAMES D. STUDLEY,\* M.F., Chief, Packaging Section, Specifications Division, Standards Branch, Procurement Division, Treasury Department  
 F. L. BOWSER, Packaging Expert, War Department  
 A. L. JONES, Packaging Section, Specifications Division, Standards Branch, Procurement Division, Treasury Department

**Concrete:** Prefabricating and Prestressing  
 ALEXANDER E. FORREST,\* B.S., Chief, Construction Materials Section, Specifications Division, Standards Branch, Procurement Division, Treasury Department  
 A. L. JONES, Packaging Section, Specifications Division, Standards Branch, Procurement Division, Treasury Department  
 W. T. THOMASSON, Construction Materials Section, Specifications Division, Standards Branch, Procurement Division, Treasury Department

## [553.] Materials Engineering Supply (1947-48)

WILLIS MACLEOD

## 554. Patent Law for Executive and Scientific Personnel

Fall, 2 credits

Designed to furnish a coverage of the basic elements of patent law of value to executives and scientific personnel in understanding and dealing with patent problems. Historical and legal background of the United States patent system; analysis of subject matter of patents; how the presence of invention is deter-

ALBERT J. KRAMER

mined; prerequisites and procedure for patenting inventions; employees' rights in their own inventions; methods of disposing of patent rights; and other matters of particular importance to scientists and executives. Course will also cover the distinctions among patents, trade-marks, and copyrights. Lectures and discussion.

<b>Practical English Usage</b>	(See p. 47)
<b>Principles of Accounting</b>	(See p. 77)
<b>Business Law</b>	(See p. 78)
<b>Advanced Public Speaking</b>	(See p. 24)
<b>Effective Meetings</b>	(See p. 24)

#### DIVISION OF SURVEYING AND MAPPING

MARSHALL S. WRIGHT (Chairman)

##### **210. Elementary Surveying**

Year, 3 credits each semester

RICHARD E. WHITAKER

Lectures and classroom work, 2 hours a week; field work, 2 hours a week. Field work will be scheduled on Saturdays as the needs of the class demand and weather permits.

*First semester:* Principles of and adjustment of the common instruments used in elementary surveying, such as the tape, compass, sextant, transit, level, hand level, planetable. Basic principles of elementary surveying. Actual use of instruments in the field. Note keeping.

*Second semester:* Principles of and actual field work in plane surveying, including plane surveying, traverse, leveling, planetabling, property surveys, etc. Plotting field notes, computations and lettering. *Prerequisite:* High school graduation.

##### **211. Advanced Surveying**

Year, 3 credits each semester

HOWARD S. RAPPLEYE

Lectures and classroom work, 2 hours a week; field work, 2 hours a week. Field work will be scheduled on Saturdays as the needs of the class demand and weather permits.

*First semester:* Classroom study and actual field work in advanced surveying applicable to topographic surveys including planetable contouring, control for aerial photography; theory and practice of highway location, geodetic surveys including triangulation, cadastral surveys.

*Second semester:* Use and adjustment of modern precision instruments. Astronomic observations for azimuth, time, latitude; precise leveling, trigonometric leveling, altimetry, figure of the earth, theory of least square adjustments. Computations. *Prerequisite:* Elementary Surveying or equivalent.

##### **Architectural Drafting**

(See p. 118)

##### **212. Elementary Aerial Photogrammetry**

Year, 3 credits each semester

W. S. HIGGINSON

Basic geometric characteristics of aerial photographs, flight planning, basic optics, basic photography and laboratory practice, photographic materials, aerial cameras, radial line plotting methods, mosaics, interpretation of photographs. *Prerequisite:* High school graduation.

**213. Advanced Aerial Photogrammetry**

Year, 3 credits each semester

G. C. TEWINKEL

Advanced geometry of aerial photographs, determination of tilt, use of oblique photographs in map making, theory and practice in use of stereoscopic plotting instruments, including the multiplex and simple contour finder. Lectures (2 hours a week) and laboratory (2 hours a week). *Prerequisite:* Elementary Aerial Photogrammetry, plane surveying, plane trigonometry.

**214. Cartography**

Year, 2 credits each semester

GEORGE H. EVERETT

This course is intended to include a study of maps and charts and certain aspects of surveying that is necessary for their proper understanding. First semester: A history of maps emphasizing the influences of early cartographers on contemporary map making; a study of the various Federal surveys with emphasis on their authorization, history, and jurisdiction; basic field data required for cartographic compilation, control surveys, topographic surveys (including elementary photogrammetry), and hydrographic surveys; the elements of map projection, including the theory and construction of the more widely used projections; the use of grids including the State Coordinate Systems.

Second semester: Will be devoted essentially to a study of the compilation and reproduction of topographic maps, nautical and aeronautical charts, and will include a review of the important map collections; methods of cartographic representation; the use of plastics; the various methods of map and chart reproduction; and the use of electronics in mapping. *Prerequisite:* Trigonometry.

**DIVISION OF FINE ARTS AND ARCHITECTURE**

GILBERT STANLEY UNDERWOOD (Chairman)

**321. Pencil Sketching and Freehand Drawing**

Fall, 2 credits. Repeated in Spring

WALTER G. CADMUS

Study of shade, shadows, and perspective. An intensive study of theory, harmony of lines, and pictorial and outdoor sketching. Each student receives individual criticism. Open to both beginners and advanced students.

**322. Art Appreciation**

Fall, 2 credits. Repeated in Spring

EDWARD B. ROWAN

Behind the scenes with the artist. This course is designed to create an awareness of art, to help form intelligent judgment of one's own and to create fresh interest in creative work and better taste in art.

Visual training will be developed by analyzing works of the old masters and the moderns, from easel drawing to present-idioms. Demonstrating the fundamentals of plastic and architectural composition—textures, mediums, dynamic color and design. Art in relation to time and place. A course for artist and layman.

**323. Drawing for Portraiture and Illustration**

Fall, 2 credits. Repeated in Spring

PIETRO LAZZARI

Introduction to painting; oil; pastel; water color; tempera. Individual projects.

**320. Water Color Painting**

Fall, 2 credits. Repeated in Spring

ROWLAND LYON

Theory and practice; painting from landscape and still life. *Prerequisite:* Course 321 or 323 or equivalent advised.

**331<sup>a</sup>. Home Decoration**

Fall, 1 credit

HARRIET GARRELS

For amateurs and homemakers. Principles of arrangement; making the most of what we have; color; walls; window treatments; floor coverings.

**331<sup>b</sup>. Home Decoration**

Spring, 1 credit

HARRIET GARRELS

Furniture woods; American and English period styles; contemporary furniture; modern decorating problems. Work in 331<sup>b</sup> is not based on work in 331<sup>a</sup>.

**332. Advanced Home Decoration**

Fall, 1 credit. Repeated in Spring

HARRIET GARRELS

A continuation of Course 331. For amateurs and homemakers. Lighting, pictures—selection, framing, hanging; flower arrangement; accessories—pottery, mirrors, etc.; oriental rugs; textiles. *Prerequisite:* Course 331 or equivalent.

**327. Domestic Architecture**

Fall, 2 credits

RICHARD POWERS

Functional planning and design of the modern home applied generally to the home of low or moderate cost. Elements of planning, such as orientation, lighting, relation of house to lot, circulation, privacy, kitchen planning, furniture arrangement. The student is taken through the complete planning of a modern low-cost or moderate-cost home.

**505. Functional House Planning**

Year, 2 credits each semester

LENORE E. SATER, J. ROBERT DODGE

Basic principles of functional house planning, covering the allocation and use of space and equipment, to provide adequately and efficiently for the aspects of family living. Principles involved in good designing, from the standpoint of appearance and general livability. Principles of sound construction, the selection of materials and equipment, from the standpoint of functional requirements to provide adequate shelter that is economical, pleasing in appearance, and easily maintained.

This course is particularly designed for those engaged in the fields of housing, household equipment, and house furnishing. Each session will include one hour of lecture and two hours of laboratory work involving the actual planning, designing, and preparation of drawings for houses. To be given in the laboratories of the USDA Agricultural Research Center, Beltsville. *Prerequisite:* Work in engineering, home economics, or allied fields.

**315. Theory of Modern Architecture**

Fall, 2 credits. Repeated in Spring

DAVID NORTON YERKES, Chairman,

and members of the Activities Committee, Washington Chapter, American Institute of Architects

Development of functional planning and design. Application of functional principles to various types of buildings. Study of materials, color, lighting, and the appropriate expression of function in plan and elevation. The course will be of special value to engineers in understanding the approach of the architect and engineer to modern buildings. *Prerequisite:* Architectural drawing and design or equivalent.

**316. Landscape Development of the Small Property**

Fall, 2 credits

CHRISTIAN F. HAGEMANN

The purpose of this course is to encourage and direct the creative impulse of the person interested in the landscape development of the small property. The course will include an outline of the basic principles of land planning and

their application to the design of the small property, with discussion of the principles of composition in relation to the selection and use of plant and other materials. The practical application of landscape design principles to specific problems. A discussion of the physical aspects of landscape development including construction methods, horticultural standards and maintenance requirements.

### 324<sup>a</sup>. Basic Mechanical Drawing

Fall, 2 credits

LEO G. D. WIEMER

Problems in conventional presentation of objects by means of lines, including geometrical problems, orthographic projection, intersections, developments, dimensioning and lettering. One hour lecture and three hours drafting room work each week.

### 324<sup>b</sup>. Basic Mechanical Drawing

Spring, 2 credits

LEO G. D. WIEMER

Advanced instruction in the elements taught under Course 324<sup>a</sup>, Basic Mechanical Drawing. One hour lecture and three hours drafting room work each week. *Prerequisite:* Course 324<sup>a</sup> or equivalent.

### 325<sup>a</sup>. Architectural Drafting

Fall, 2 credits

LEO G. D. WIEMER

Study of framing method and use of building materials, architectural symbols. Drawing of necessary construction details, plan. Section and elevations for a series of buildings, from sketches. One hour lecture and three hours drafting room work each week. *Prerequisite:* Course 324 or equivalent.

### 325<sup>b</sup>. Architectural Drafting

Fall, 2 credits. Repeated in Spring

LEO G. D. WIEMER

A continuation of Course 325<sup>a</sup>, Architectural Drafting, with advanced instruction in the same subject material. One hour lecture and three hours drafting room work each week. *Prerequisite:* Course 325<sup>a</sup> or equivalent.

### 326. Engineering and Machine Drafting

Fall, 2 credits. Repeated in Spring

LAWRENCE CONWAY

Study of conventional symbols and machine shop practice. A series of problems including detail and assembly drawings. Scale detail drawings from measured sketches by the student. One hour lecture and three hours drafting room work each week. *Prerequisite:* Course 324 or equivalent.

## DIVISION OF TECHNICAL ARTS

R. G. HAINSWORTH (Chairman)

### 28. Blueprint Reading

Fall, non-credit

LAWRENCE CONWAY

The interpretation of drawings and the expression of ideas by the use of drawings; to visualize objects, identify parts, types, quantities and materials through drawings; the meanings of abbreviations and symbols accepted by the profession. One hour lecture and three hours drafting room work each week.

### [329.] Home Gardening

### 188. Glass Blowing

Year, 2 credits each semester

L. B. CLARK

A laboratory course for technicians. Simple manipulation of joining, bending, and shaping is carried through to the production of useful apparatus.

Metal in glass and glass to metal seals of all types are made. During the first semester the soft glasses are utilized for practice; during the second semester the related glasses are used. Ample opportunity for advanced work is given those who show themselves particularly adapted to the work. (New students may be admitted in the Spring if space permits.)

## Photography

### COMMITTEE ON PHOTOGRAPHY

MARSHALL S. WRIGHT (Chairman)

IVON H. BLACKMAN, Jr., Assistant Chief, Facilities and Equipment Section, Industrial Feeding Division, Food Distribution, Production and Marketing Administration, USDA

DAN M. BRAUM, B.S.A., Division of Training, Office of Personnel, USDA

RAYMOND DAVIS, Chief, Photographic Technology Section, National Bureau of Standards, Department of Commerce

H. R. HARMON, Manager, Washington Office, Ansco Division, General Aniline and Film Corporation

COL. R. J. LEFEBVRE, B.C., Chief, Reproduction Branch, Department of State

KEITH B. LEWIS, A.B., Manager, Government Sales Division, Washington Office, Eastman Kodak Company

JAMES H. McCORMICK, M.S., Executive Assistant to the Director, Office of Information, USDA

ELBRIDGE C. PURDY, Assistant Chief, Photographic Section, Photographic and Duplicating Services Division, Office of Plant and Operations, USDA

VERNON D. TATE, Ph.D., Director, Photographic Records Office, National Archives

WILL H. TOWLES, Master Photographer, Past President, Photographers' Association of America and former Director of the Association's School

LYNN R. WICKLAND, Chief, Reproduction Division, Army Map Service, War Department

*Note:* A limited number of additional Spring Semester (1946-47) courses in specialized fields of photography were in process of development by the Committee on Photography at the time this Bulletin went to press. A special announcement describing them is available on request.

—O—

### 192. Basic Photography

Fall, 2 credits. Repeated in Spring

CARL H. HANSON and SPECIALISTS

A lecture-demonstration course, elementary and basic in character, designed to meet the needs of the amateur. Nearly all lectures are fully illustrated with slides, supplemented by other illustrative material. Demonstrations are given when feasible. No laboratory work, but individual guidance will be freely given students who can and will arrange to do practice work. Results of practice work may be submitted for criticism.

Topics covered: elementary photographic optics, films, and plates, the use of cameras and lenses, exposure, composition, darkroom conveniences and technique, developers and development, the technique of negative making, the theory and practice of making contact and projection prints, outdoor and indoor photography, child photography, filters and their use, lighting and posing in portraiture, home portraiture, Kodachrome photography.

### Art Appreciation

(See p. 116)

### 197. Chemistry of Photography

Fall, 2 credits. Repeated in Spring

JOHN DONOVAN FAUST

Brief review of fundamental laws and principles of chemistry. Qualitative investigation of light-sensitive elements and compounds. Quantitative study of reactions involved in the manufacture and processing of photographic materials. Action of dyes on sensitivity of materials. Reactions involved in dye coupling. Relation of processing reactions to gamma. Laboratory demonstrations will be presented. *Prerequisite:* High school chemistry, algebra or permission of instructor.

**193. Applied Photography**

Fall, 2 credits. Repeated in Spring

ELBRIDGE C. PURDY

A laboratory course which enables the students who have taken Course 192 or equivalent to apply theory and principles in the studio and laboratory. Individual guidance will be given students. The results of the work will be analyzed. Topics covered: films and plates, use of cameras and lenses, exposure, composition, darkroom techniques, developers and development, theory and practice of making contact and projection prints, outdoor and indoor photography, filters and their use, lighting and posing in portraiture, and color photography. *Prerequisite:* Basic Photography or equivalent.

**196. Applied Color Photography**

Fall, 2 credits. Repeated in Spring

ELBRIDGE C. PURDY

A laboratory course in the application of color reproduction theory to color photography. Includes: spectral transmission of filters; sensitivity of emulsions; color separations; color printing processes; multilayer film and printing materials; and dye processes. *Prerequisite:* Course 193 or Course 507 or equivalent, or comparable practical photographic experience approved by instructor.

**507. Theory of Color Photography**

Fall, 2 credits

ROBERT J. LEFEBVRE and Special Lecturers

Designed to cover the general development of color photography and to acquaint the student with current advances and discoveries. Includes: colorimetry; subjective and objective color reproduction; color cameras; emulsions; tri-packs, bipacks and monopacks; Kodachrome and Dye Transfer; Ansco Color and Printon; screen plates and lenticular process; separation negatives; masking; toning; primary color and coupling development; Gaspar color process; carbro process; and Diazo and bleach-out photography. Text: J. S. Friedman, *History of Color Photography*. *Prerequisite:* Course 192 or equivalent or comparable practical photographic experience.

Certain major topics will be handled by outstanding guest lecturers, such as:

WALTER CLARK, Ph.D., Assistant Director, Eastman Research Laboratory, Rochester, N. Y.

DEAN B. JUDD, Ph.D., Chief of Colorimetry, National Bureau of Standards

CAPT. DUDLEY P. LEE, Corps of Engineers, War Department (Inventor of the Triack Color Process)

ALFRED MATERAZZI, Chief of Reproduction Research, Army Map Service (Specialist in the Ullmann Process)

WILLIAM J. NAGEL, Ansco Representative (Specialist in Printon Ansco Color Process)

CAPT. LEWIS B. WERNER, Corps of Engineers, War Department (Specialist in color photography)

**Elementary Aerial Photogrammetry**

(See p. 115)

**Advanced Aerial Photogrammetry**

(See p. 116)

**Advanced Optics**

(See p. 58)

**Textiles****COMMITTEE ON TEXTILES**

RUTH O'BRIEN, LL.B., Assistant Chief, Bureau of Human Nutrition and Home Economics, Agricultural Research Administration, USDA (Chairman)

MARGARET L. BREW, Ph.D., Economist, Bureau of Human Nutrition and Home Economics, Agricultural Research Administration, USDA

MILTON HARRIS, Ph.D., Director, Milton Harris Associates

ELSA ORENT KEILES, D.Sc., Principal Nutrition Chemist, Bureau of Human Nutrition and Home Economics, Agricultural Research Administration, USDA

HERBERT F. SCHIEFER, Ph.D., Senior Physicist, National Bureau of Standards, Department of Commerce

**150. Fibers of Industrial Importance**

Fall, 2 credits

EARL E. BERKLEY, JOHN I. HARDY and SPECIALISTS

This is a lecture-demonstration course basic to an understanding of fibers of industrial importance. It is intended to meet the needs of those whose work is related to animal, vegetable, synthetic or mineral fibers. These fibers are used in such industries as textile cordage, brush and broom, insulation, paper, upholstery, and felt.

Topics covered will include identification and properties, marketing, processing and merchandising. Authorities in different fields will participate as special lecturers. *Prerequisite:* Work in textiles or related fields.

**250. Textile Design and Fabric Development**

Spring, 3 credits

WALTER BALDWIN, JR.

The technical planning of woven fabrics. Intended to be particularly useful to persons engaged in textiles for military or procurement activities or those in Governmental agencies with bureaus engaged in work concerning the textile industry. Equally important to buyers and sales personnel handling textiles and related items in department stores. Subjects covered include: basic weaves and derivatives thereof; leno and pile structures; Jacquard design; relation of weave to physical properties of fabrics; mill specifications and drafts; types of looms and their capacities; cloth analysis; cost calculations; manufacturing operations. Fabrics of varied types, from heavy duck to brocade, are discussed. Students analyze samples and draft original designs for new fabrics, giving the technical particulars required for manufacturing.

**350. Textile Testing**

Year, 2 credits each semester

HERBERT F. SCHIEFER

The methods and instruments for evaluating the basic mechanical and functional properties of fibers, yarns and fabrics will be studied. These properties include tensile strength, elongation, elasticity, tenacity, breaking length, fatigue, resilience, hysteresis, permanent set, creep, impact strength, fineness of fiber, specific weight, swelling, stiffness, flexibility, crease resistance, coefficient of friction, tautness, resistance to abrasion and tear resistance.

The National Bureau of Standards laboratories will be used and special attention will be given to operational details of the testing instruments, their influence upon the results, interpretation and correlation of results of tests, and conversion of results into appropriate and consistent units. *Prerequisite:* Introductory courses in mathematics and physics or 2 years college work.

**450. Survey of Recent Technical Developments in Textiles**

Fall, 2 credits

W. D. APPEL and SPECIALISTS

A brief survey of new fibers, fabrics and finishes, compared and contrasted with well-known fibers and products. Attention will be given to developments in cellulosic and protein fibers; nylon; vinyl and vinylidene fibers; coated fabrics and plastic fibers; mechanical fabrics and other fibers. Prospects for future use and developments will be discussed.

This course is designed especially for those persons who are working in textiles and in related fields and desire latest information about specific technical developments in these fields. *Prerequisite:* Courses in organic chemistry and physics or equivalent experience.

**Economics of Clothing and Textiles**

(See p. 88)

**Organic Chemistry**

(See p. 52)

**Introductory College Physics**

(See p. 57)

## DIVISION OF UTILITY REGULATION

FAYETTE S. WARNER (Chairman)

## Traffic Management—Rates and Rate Determinations

(See p. 105)

## Commercial Air Transportation

(See p. 105)

## World Communications and Transport

(See p. 98)

## Imperfect Competition and Public Regulation

(See p. 86)

## Regulation of Communication

(See p. 103)

## Research Methods in Radio Programs

(See p. 39)

## [679.] Electric and Gas Utility Rates (1947-48 and alternate years)

H. W. BLALOCK

## [677.] Public Power

## [680.] Public Utility Evidence

## [581.] Manufacturing Industries and Their Use of Energy

## DIVISION OF ENGINEERING SOCIAL-HUMANITIES STUDIES

ROBERT W. TRULLINGER (Chairman)

## 707. Ethics for Engineers

Fall, 1 credit

F. J. SETTE

A brief survey of classical ethical theories, professional ethics and engineering codes of practice. Relationship of the engineer to other engineers, clients, contractors and the public, with special reference to the responsibilities of the engineer in the Federal service.

## 708. History of Engineering (alternate years)

Year, 3 credits each semester

F. J. SETTE

A study of the development of engineering enterprise, the organization of men, machines and materials for the construction and operation of engineering projects, the position of the engineer, the labor force, methods of financing, determinations of design, and the effect of such enterprises upon society. The first semester will cover primitive and ancient engineering; the second, medieval and modern.

## [709.] History of Western Material Civilization (1947-48 and alternate years)

F. J. SETTE

## Introduction to Economics, Theory and Institution

(See p. 85)

## General Sociology

(See p. 101)

**Psychology of Human Relations** (See p. 99)

**World Politics** (See p. 96)

**Problems of National Defense and Prevention of War** (See p. 97)

**Current Policy Problems of American Agriculture** (See p. 91)

## Faculty

J. K. ABLEITER, M.S., Wisconsin. Principal Soil Scientist, Chief Inspector, Division of Soil Survey, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, USDA. Taught in North Dakota State. (Physical Sciences)

LAURENCE W. ACKER, C.P.A. Chief, Division of Accounting, Office of Budget and Finance, USDA. Taught in Tyler Commercial College. (Public Administration)

JOHN ALBRIGHT, M.A., Colorado State. Chief, Wholesale Trade, Bureau of the Census, Department of Commerce. Taught in Indiana Central College. (Social Sciences)

BUSHROD W. ALLIN, Ph.D., Wisconsin. Chairman, Outlook and Situation Board, Bureau of Agricultural Economics, USDA. Taught in Wisconsin. (Social Sciences)

A. AMIRIKIAN, C.E., Cornell. Head Engineer, Bureau of Yards and Docks, Navy Department. Taught in George Washington University. (Technology)

LOUIS H. ANDERSON, LL.B., Washington College of Law. Attorney; formerly Chief, Distribution Branch, Office of Price Administration. (Languages and Literature)

NELS ANDERSON, Ph.D., New York University. Assistant to the Director of Labor Branch, National Housing Agency. Taught in Columbia and New York University. (Social Sciences)

W. D. APPEL, B.S., Chicago. Chief, Textiles Section, Division of Organic and Fibrous Materials, National Bureau of Standards, Department of Commerce. (Technology)

WALTER BALDWIN, Jr., Diploma, Philadelphia Textile Institute. Price Analyst, Cotton Section, Consumer Goods Price Branch, Office of Price Administration. (Technology)

EDWARD S. BARBER, C.E., Maryland. Highway Engineer, Public Roads Administration. (Technology)

MARGARET E. BARRON, M.A., Maryland. Chief, Employee Counseling and Services Section, Division of Personnel Management, Federal Security Agency. (Public Administration)

CONSUELO BATISTA, Secretary, Cuban Embassy. Taught in Escuela Normal para Maestras, Havana. (Languages and Literature)

MAGNA E. BAUER, Auguste Victoria Lyzeum, Berlin. Economic Analyst, Office of International Trade Area Branch, European Division, Department of Commerce. (Languages and Literature)

GEORGE E. BEAUCHAMP, Ph.D., Northwestern. Chief, Publications Control Unit, Bureau of the Budget. Taught in Manchester College, Northwestern and University of Nottingham. (Languages and Literature)

HARVEY E. BECKNELL, M.A., Columbia. Chief, Office of Management Planning and Review, Bureau of Labor Statistics, Department of Labor. President, 1945-46, Washington Chapter, Society for Advancement of Management. (Public Administration)

EARL E. BERKLEY, Ph.D., Washington University of St. Louis. Senior Fiber Technologist, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, USDA. (Technology)

HERBERT R. BIRD, Ph.D., Wisconsin. Senior Biochemist, In Charge of Poultry Nutrition Investigations, Bureau of Animal Industry, Agricultural Research Administration, USDA. Taught in Universities of Maryland and Wisconsin. (Biological Sciences)

F. C. BISHOPP, Ph.D., Ohio State. Assistant Chief, Bureau of Entomology and Plant Quarantine, Agricultural Research Administration, USDA. Taught in Colorado Agricultural College and University of Maryland. (Biological Sciences)

SIDNEY F. BLAKE, Ph.D., Harvard. Senior Botanist, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, USDA. Taught in Stanford. (Biological Sciences)

JULIEN L. BOATMAN, M.A., Iowa State. Chief, Division of Subject Matter, Extension Service, USDA. Taught in Iowa State. (Languages and Literature)

ANNA C. BOLTON, M.A., New York University. Training Specialist, Office of Fiscal Director, War Department. (Office Techniques)

RALPH R. BOTTs, B.S., Florida. Senior Agricultural Economist, Insurance Section, Division of Agricultural Finance, Bureau of Agricultural Economics, USDA. (Public Administration and Social Sciences)

C. VERNE BOWEN, M.S., Washington and Jefferson. Chemist, Bureau of Entomology and Plant Quarantine, Agricultural Research Administration, USDA. Taught in Washington and Jefferson College. (Physical Sciences)

ALVA E. BRANDT, Ph.D., Iowa State. Research Specialist in Charge of Experimental Design and Analyses, Soil Conservation Service, USDA. Taught in Iowa State and Oregon State. (Mathematics and Statistics)

DANIEL M. BRAUM, B.S.A., Kansas State. Assistant Chief, Division of Training, Office of Personnel, USDA. (Office Techniques)

MARGARET L. BREW, Ph.D., Chicago. Economist, Bureau of Human Nutrition and Home Economics, Agricultural Research Administration, USDA. Taught in Oregon State and Minnesota. (Social Sciences)

JOSEPH S. BROCK, M.S., North Carolina. Physicist, Head of Photoelastic Laboratory, David Taylor Model Basin, Navy Department. (Technology)

MARCUS GORDON BROWN, Docteur ès Lettres, Université de Dijon. Specialist, Inter-American Educational Relations, U. S. Office of Education. Taught in Florida and Georgia School of Technology. (Languages and Literature)

MARIE D. BRYAN, M.A., Maryland. Instructor in College of Education and College of Arts and Sciences, University of Maryland. (Office Techniques)

WILLIAM K. BROWNOLD, B.C.S., Southeastern. Chief of Lend-Lease Accounts and Reports, Treasury Department. (Public Administration)

JAMES L. BUCKLEY, LL.B., Georgetown. Assistant Director of Personnel, USDA. (Public Administration)

RALPH BURTON, Ph.D., Chicago. Principal Administrative Analyst, Bureau of the Budget. (Public Administration)

WALTER G. CADMUS, JR., B.S., Kansas. Agricultural Engineer, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, USDA. (Technology)

ELIZABETH C. CALLISÓN, M.S., Yale. Nutrition Physiologist, Bureau of Human Nutrition and Home Economics, Agricultural Research Administration, USDA. Taught in Mt. Holyoke, Goucher College, and Yale School of Nursing. (Biological Sciences)

CHARLES F. CANNELL, M.A., Ohio State. Head, Field Section, Division of Program Surveys, Bureau of Agricultural Economics, USDA. Taught in Ohio State. (Social Sciences)

ROSCOE H. CARTER, M.S., Iowa State. Chemist, Bureau of Entomology and Plant Quarantine, Agricultural Research Administration, USDA. (Physical Sciences)

JAMES P. CAVIN, Ph.D., Harvard. Associate Head, Division of Statistical and Historical Research, Bureau of Agricultural Economics, USDA. Taught in University of Puerto Rico and Catholic University. (Social Sciences)

HARDEE CHAMBLISS, Ph.D., Johns Hopkins. Consulting Chemist and Chemical Engineer. Geophysical Instrument Company. Formerly Dean of School of Sciences and School of Engineering, Catholic University. (Physical Sciences)

DWIGHT W. CHAPMAN, Ph.D., Harvard. Assistant Research Director, Washington Post. Taught in Bennington College, Harvard, Columbia and George Washington. (Social Sciences)

L. B. CLARK, B.S., California. Senior Mechanical Engineer, Radiation Research, Smithsonian Institution. Taught in the University of California and San Francisco Research Laboratory. (Technology)

WILLARD W. COCHRANE, Ph.D., Harvard. Agricultural Economist, Bureau of Agricultural Economics, USDA. Taught in Minnesota. (Social Sciences)

HUBERT S. COFFEY, Ph.D., Iowa. Chief, Training Section, Federal Security Agency. Taught in Central Washington College. (Social Sciences)

ALICE COFFMAN, Administrative Officer, Interim Research Planning Division, ESP, State Department. (Office Techniques)

WILBUR J. COHEN, Ph.B., Wisconsin. Assistant Director, Bureau of Research and Statistics, Social Security Board, Federal Security Agency. (Social Sciences)

M. ELDON COLBY, A.B., Nebraska. Chief, Underwriting Division, Federal Crop Insurance Corporation, Production and Marketing Administration, USDA. (Social Sciences)

LAWRENCE D. CONWAY, Architect, Office of the Supervising Architect, Public Buildings Administration, Federal Works Agency. (Technology)

RICHARD K. COOK, Ph.D., Illinois. Chief, Sound Section, National Bureau of Standards, Department of Commerce. Taught in Illinois. (Mathematics and Statistics)

JOHN C. COOPER, A.B., Furman. Chief, Division of Audit, Office of Budget and Finance, USDA. (Office Techniques)

VIRGIL L. COUCH, B.S., Kentucky. Chief Personnel Officer, Farm Security Administration, USDA. (Public Administration)

CAREY G. CRUIKSHANK, A.B., King. Budget and Finance Officer, Office of Scientific Research and Development, Office for Emergency Management. (Office Techniques)

ALFRED D'ALESSANDRO, M.A., Harvard. Chief, Examination Branch, Financial Reporting, Office of Price Administration. Taught in Northeastern University. (Public Administration)

JOSEPH F. DALY, Ph.D., Princeton. Consultant on Sampling, Office of the Director, Bureau of the Census, Department of Commerce. Taught in Catholic University and Princeton. (Mathematics and Statistics)

JOHN H. DAVIS, M.A., Minnesota. Executive Secretary, National Council of Farmer Cooperatives. (Social Sciences)

RAUL D'ECA, Ph.D., George Washington. Acting Head, Brazilian Branch, American Republics Area Division, Office of International Information and Cultural Affairs, Department of State. Taught in George Washington. (Languages and Literature)

W. EDWARDS DEMING, Ph.D., Yale. Adviser in Sampling, Bureau of the Budget. Taught in Wyoming, Colorado, and Yale. Special lecturer, National Bureau of Standards. (Mathematics and Statistics)

HARRY W. DETRICH, Retirement Representative, Retirement Division, U. S. Civil Service Commission. (Social Sciences)

RICHARD S. DILL, B.S., North Carolina State. Chief, Heat Transfer Section, National Bureau of Standards, Department of Commerce. Taught in the University of Maryland. (Technology)

J. ROBERT DODGE, B.A., Pennsylvania. Architect, Division of Farm Buildings and Rural Housing, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, USDA. (Technology)

ABBEFORD S. DOLCH, Transportation Specialist, Marketing Facilities Branch, Production and Marketing Administration, USDA. (Social Sciences)

L. E. DONALDSON, Assistant Chief in Charge of Records Management, Office of Plant and Operations, USDA. (Office Techniques)

LOUIS J. DUCOFF, B.S., Rutgers. Principal Agricultural Economist, Division of Farm Population and Rural Welfare, Bureau of Agricultural Economics, USDA. (Social Sciences)

WILLIAM L. DYE, C.P.A. Acting Chief, Corporate Fiscal Service Division, Office of Budget and Finance, USDA. (Public Administration)

EDWARD P. EARDLEY, B.S., E.E., Utah. Regional Construction Engineer, Rural Electrification Administration, USDA. (Technology)

IMOCENE P. EARLE, Ph.D., Vanderbilt. Associate Biochemist, Division of Animal Husbandry, Bureau of Agricultural Economics, USDA. Taught in Vanderbilt School of Medicine. (Biological Sciences)

EVERETT E. EDWARDS, M.A., Harvard. Agricultural Historian, Bureau of Agricultural Economics, USDA. Taught in Northwestern, Missouri, Miami University and Catholic University. (Social Sciences)

OLIVER F. EGLESTON, M.A., Harvard. Supervisor, Intelligence Division, War Department. Taught in Universities of North Dakota and Nebraska.

WALTER B. EMERY, Ph.D., Wisconsin. Attorney, Federal Communications Commission. Taught in Oklahoma, Wisconsin, and Ohio State. (Languages and Literature and Social Sciences)

RUSSELL C. ENGBERG, Ph.D., Columbia. Chief, Economic and Credit Research Division, Farm Credit Administration, USDA. Taught in Iowa State and Minnesota and Idaho. (Social Sciences)

DOUGLAS ENSMINGER, Ph.D., Cornell. Social Scientist, Bureau of Agricultural Economics and in Charge Rural Sociology Extension Work, Extension Service, USDA. Taught in Cornell. (Languages and Literature and Social Sciences)

NAOMI H. EVANS, B.S., Grove City College. Associate Training Specialist, Army Air Forces, War Department. (Office Techniques)

GEORGE H. EVERETT, B.S. in C.E., Clarkson College of Technology. Cartographic Engineer, U. S. Coast and Geodetic Survey, Department of Commerce. Taught in American Institute, Bolivia. (Technology)

JOSEPH EWAN, A.B., California. Assistant Curator, Division of Plants, U. S. National Museum. Taught in Colorado. (Biological Sciences)

MORDECAI EZEKIEL, Ph.D., Brookings. Economic Advisor, Office of the Chief, Bureau of Agricultural Economics, USDA. Taught in Minnesota and Cornell. (Social Sciences)

JOHN DONOVAN FAUST, A.B., West Virginia University. In Charge, Map Reproduction Unit, Division of Cartography, Soil Conservation Service, USDA. (Technology)

E. J. FINAN, Ph.D., Ohio State. Associate Professor, Catholic University. (Mathematics and Statistics)

WINN F. FINNER, M.S., Wisconsin. Agricultural Economist, Bureau of Agricultural Economics, USDA. (Social Sciences)

THOMAS J. FLAVIN, LL.B., Georgetown. Judicial Officer, Office of the Secretary, USDA. Taught in Georgetown University. (Public Administration)

JEAN A. FLEXNER, Ph.D., Brookings. Labor Economist, Foreign Labor Conditions Staff, Bureau of Labor Statistics, Department of Labor. Taught in Ohio State. (Social Sciences)

BERNARD P. FOOTE, B.S.S., Bowling Green. Assistant Clerk Stenographer, Board of Immigration Appeals, Department of Justice. Serves as White House Special Reporter. Taught in Union College. (Office Techniques)

F. RAYMOND FOSBERG, Ph.D., Pennsylvania. Botanist, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, USDA. Taught in University of Hawaii. (Physical Sciences)

FREDERICK P. FRUTCHEY, Ph.D., Ohio State. In Charge, Foreign Students Program, Division of Field Studies and Training, Extension Service, USDA. Taught in Ohio State University and University of Missouri. (Social Sciences)

HARRIET GARRELS, M.A., George Washington. Art Supervisor, Public Schools, District of Columbia. Taught in Abbott Art School and Wilson Teachers College. (Technology)

MARTIN A. GARSTENS, Sc.D., Massachusetts Institute of Technology. Physicist, Naval Research Laboratory, Navy Department. Taught in Massachusetts Institute of Technology. (Physical Sciences)

HARRY L. GARVER, B.S., E.E., Washington State College. Senior Agricultural Engineer, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, USDA. (Technology)

BENJAMIN GERIG, D.Sc., Geneva. Chief, Division of Dependent Area Affairs, Department of State. Taught in Simmons College, Haverford College and Illinois. (Social Sciences)

MEYER A. GIRSHICK, Ph.D., Columbia. Principal Agricultural Statistician, Bureau of Agricultural Economics, USDA. (Mathematics and Statistics)

MICHAEL GOLDBERG, M.A., George Washington. Head Engineer, Bureau of Ordnance, Navy Department. (Mathematics and Statistics)

MARION C. GOLDSWORTHY, Ph.D., California. Pathologist, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, USDA. (Biological Sciences)

WYLIE D. GOODSELL, Ph.D., Minnesota. Head, Costs and Returns Section, Division of Farm Management and Costs, Bureau of Agricultural Economics, USDA. Taught in Iowa State. (Social Sciences)

EARL A. GRAHAM, B.S., New Mexico A. & M. Principal Economic Analyst, Division of Accounts, Statistics and Economic Investigations, Federal Trade Commission. (Social Sciences)

CLYDE H. GRAVES, Ph.D., Chicago. Chief, Operations Branch, Office of Price Board Management, Office of Price Administration. (Mathematics and Statistics)

JAMES F. GREEN, Ph.D., Yale. Acting Associate Chief, Division of Dependent Area Affairs, Office of Special Political Affairs, Department of State. Taught in Mt. Holyoke College and Denver. (Social Sciences)

PHILIP L. GREEN, Chief, West Coast South American Section, American Republics Division, Department of Commerce. Taught Latin American civilization in Inter-American Institute of Roerich Museum, New York; and College of the City of New York, American and Maryland. (Social Sciences)

ROMAIN C. GREENE, M.A., Drake. Instructor in English, University of Maryland. (Languages and Literature)

NELSON P. GUDRY, Cartographer, Office of Foreign Agricultural Relations, USDA. (Mathematics and Statistics)

CHRISTIAN F. HAGEMANN, B.S., Cornell. Site Planner, Public Buildings Administration, Federal Works Agency. (Technology)

EVERETT E. HAGEN, Ph.D., Wisconsin. Chief, Division of Fiscal Policy and Program Analysis, Office of War Mobilization and Reconversion. Taught in Michigan State. (Social Sciences)

MARGARET HAGOOD, Ph.D., North Carolina. Principal Social Scientist, Division of Farm Population and Rural Welfare, Bureau of Agricultural Economics, USDA. Taught in North Carolina. (Social Sciences)

R. G. HAINSWORTH, M.A., American. Principal Economic Geographer, Office of Foreign Agricultural Relations, USDA. (Mathematics and Statistics and Social Sciences)

WALTER J. HAMER, Ph.D., Yale. Chemist, National Bureau of Standards, Department of Commerce. Taught in Juniata College, Catholic University, and Yale. (Physical Sciences)

KEITH L. HANNA, LL.B., Indiana Law School. Assistant Budget Officer, Farm Security Administration, USDA. (Office Techniques)

MORRIS H. HANSEN, M.A., American. Statistical Assistant to the Director, Bureau of the Census, Department of Commerce. Taught in American University. (Mathematics and Statistics)

CARL H. HANSON, B.S., Wisconsin. Formerly Specialist in Visual Instruction, Extension Service, USDA. Thirty years' experience in lecturing and teaching, primarily in visual instruction, including photography. (Technology)

JOHN I. HARDY, Ph.D., Missouri. Senior Animal Fiber Technologist, Bureau of Animal Industry, Agricultural Research Administration, USDA. (Technology)

SUSAN E. HARMAN, Ph.D., Johns Hopkins. Professor of English, University of Maryland. (Languages and Literature)

PHILIP M. HAUSER, Ph.D., Chicago. Assistant to the Secretary of Commerce and Assistant Director, Bureau of the Census, Department of Commerce. Taught in University of Chicago. (Social Sciences)

HAROLD HEDGES, M.A., Nebraska. Chief, Cooperative Research and Service Division, Farm Credit Administration, USDA. Taught in Kansas State and Nebraska. (Social Sciences)

CARL HEISIG, M.S., Wisconsin. Head, Division of Farm Managements and Costs, Bureau of Agricultural Economics, USDA. Taught in Washington State. (Social Sciences)

WILLIAM G. HELFRICH, LL.B., Cornell. Chief Counsel, Procurement Division, Treasury Department. (Technology)

JULES HENRY, Ph.D., Columbia. Labor Economist, Staff on Foreign Labor Conditions, Bureau of Labor Statistics, Department of Labor. Taught in Columbia, Brooklyn College and Instituto Politecnico Nacional, Mexico. (Social Sciences)

H. T. HERRICK, C.E., Columbia. Special Assistant to the Chief of Bureau, Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, USDA. (Biological Sciences)

THOMAS J. HICKEY, LL.M., Columbus University. Budget and Management Branch, Production and Marketing Administration, USDA. (Office Techniques)

W. S. HIGGINSON, M.A., Utah. Unit Supervisor, Photogrammetric Section, U. S. Geological Survey, Department of Interior. Taught in George Washington. (Technology)

ROBERT L. HILL, A.B., Washington. Head, Salary Administration Section, Office of Personnel, USDA. (Public Administration)

FRANCIS P. HOEBER, A.B., Antioch. Senior Economist, Office of Price Administration. (Mathematics and Statistics)

DELIGHT WILLIAMSON HOLT, B.S., Columbia. Instructor of English, University of Maryland. (Languages and Literature)

WARNER H. HORD, M.B.A., Harvard. Chief, Accounting and Rates Division, Civil Aeronautics Board. Taught in Tulane. (Public Administration)

DONALD C. HORTON, Ph.D., Michigan. Principal Economist, Head of Mortgage Credit Section, Division of Agricultural Finance, Bureau of Agricultural Economics, USDA. Taught in Brown, Michigan and Ohio State. (Social Sciences)

HARRY B. HUMPHREY, Ph.D., Minnesota. Principal Pathologist (retired), Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, USDA. Taught in Stanford, Hopkins Marine Station, and Washington State. Member, Cercle Français, D. C. (Languages and Literature)

WILLIAM HURWITZ, M.A., Columbia. Senior Statistician, Bureau of the Census. (Mathematics and Statistics)

GEORGE W. IRVING, Jr., Ph.D., George Washington. Head, Division of Biologically Active Compounds, Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, USDA. Taught in George Washington University and Cornell Medical School. (Biological Sciences)

MARGARET IVES, Ph.D., Michigan. Psychologist, St. Elizabeths Hospital, Federal Security Agency. Taught in St. Elizabeths Hospital School of Nursing, Howard, Michigan and George Washington. (Social Sciences)

CHARLES E. JACOB, M.S., Columbia. Hydraulic Engineer, Water Resources Branch, U. S. Geological Survey, Department of Interior. Taught in Columbia. (Technology)

J. J. A. JESSEL, D.Sc., Harvard. Senior Electrical Engineer, Federal Power Commission. (Technology)

CHARLES B. JOHNSON, M.S., California Institute of Technology. Associate Meteorologist, Weather Bureau, Department of Commerce. (Physical Sciences)

SHERMAN E. JOHNSON, Ph.D., Harvard. Assistant Chief, Bureau of Agricultural Economics, USDA. Taught in Minnesota, Montana State and South Dakota State. (Social Sciences)

V. WEBSTER JOHNSON, Ph.D., Wisconsin. Head, Division of Land Economics, Bureau of Agricultural Economics, USDA. Taught in Maryland, North Dakota State, and Syracuse. (Social Sciences)

CARTER D. JOHNSTON, Ph.D., Chicago. Biochemist, Division of Pharmacology, Food and Drug Administration, Federal Security Agency. (Physical Sciences)

MARJORIE C. JOHNSTON, Ph.D., Texas. Specialist in Spanish, U. S. Office of Education. Taught in Texas and Stephens College. (Languages and Literature)

W. A. JUMP, Director of Finance and Budget Officer, USDA. Lecturer, American University. (Public Administration)

GEORGE KATONA, Ph.D., Goettingen. Social Science Analyst, Bureau of Agricultural Economics, USDA. Taught in University of Frankfurt, New School for Social Research and University of Chicago. Formerly Associate Editor of The German Economist. Foreign Correspondent for The Wall Street Journal. Author. (Social Sciences)

MILTON KAUFMAN, M.S., College of City of New York. Economist, Foreign Trade Division, Bureau of the Census, Department of Commerce. (Mathematics and Statistics)

E. GORDON KEITH, Ph.D., Harvard. Assistant Director of Tax Research, Treasury Department. Taught in Amherst, Harvard, Pennsylvania. (Social Sciences)

ISABELLE M. KELLEY, M.S., Iowa State. Agricultural Economist, Food Distribution Programs Branch, Production and Marketing Administration, USDA. (Social Sciences)

CHARLES E. KELLOGG, Ph.D., Michigan State. Chief, Division of Soil Survey, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, USDA. Taught in North Dakota State, Michigan State and Wisconsin. (Physical Sciences)

C. C. KIESS, Ph.D., California. Senior Physicist, National Bureau of Standards, Department of Commerce. Taught in Pomona College, Missouri and Michigan. (Physical Sciences)

WILLIAM A. KILGORE, Ph.D., Columbia. Instructor of Physics, Wilson Teachers College. (Physical Sciences)

GEORGE BARR KING, B.A., California. Economist, Federal Communications Commission. Taught in University of California. (Mathematics and Statistics)

RALPH F. KOEBEL, S.J.D., Georgetown. Chief, Research and General Legal Services Division, Office of the Solicitor, USDA. (Public Administration and Social Sciences)

W. E. KONECNY, M.S., Michigan. Aircraft Specialist, Civil Aeronautics Board. Taught in University of Michigan and Columbia Technical Institute. (Technology)

EDWARD I. KOTOK, M.S., Michigan. Assistant Chief, In Charge of Research, Forest Service, USDA. Taught in California. (Social Sciences)

ALBERT J. KRAMER, LL.B., George Washington. Patent Adviser, Office of the Solicitor, USDA. (Technology)

ASTRID W. KRAUS, M.A., Radcliffe. Assistant Chief, Employee Relations Branch, Office of Personnel, Office of Price Administration. Taught in East Greenwich Academy. (Public Administration)

IRVING B. KRAVIS, M.A., Pennsylvania. Statistician, Bureau of Labor Statistics, Department of Labor. Taught in Whitman College. (Social Sciences)

SOFIA KRISSILLAS, Graduate, Normal School, Panama City. Editorial Assistant of the Bulletins, Pan American Sanitary Bureau. Taught in private schools. (Office Techniques)

LOUISE M. KRUEGER, M.A., George Washington. Fiscal Inspector, Office of Budget and Finance, USDA. Taught in George Washington University. (Office Techniques)

HAROLD C. LARSEN, M.S., Kansas State. Senior Agricultural Economist, Division of Agricultural Finance, Bureau of Agricultural Economics, USDA. Taught in Kansas State and Wisconsin. (Social Sciences)

WILLIAM C. LAXTON, A.B., George Washington. Chief, Division of Classification, Office of Personnel, USDA. (Public Administration)

PIETRO LAZZARI, Master Artist, Ornamental School of Rome. Belle Arti. Portrait artist, landscape painter, and graphic designer. Taught in George Washington. (Technology)

MAX LEDERER, Ph.D., University of Vienna, Austria. Fellow in education and German language and literature, Reference Department, Library of Congress. Taught in Municipal Teachers College, Vienna, and Coe College. (Languages and Literature)

ROBERT J. LEFEBVRE, A.B., New York University. Chief, Reproduction Branch, Department of State. Formerly Chief of Cartography and Reproduction, Research and Intelligence Division, War Department, and Chief of Reproduction Division, Office of Strategic Services. (Technology)

NATHAN LEITES, Ph.D., Fribourg. Regional Specialist, Office of International Information and Cultural Affairs, State Department. Taught in New School for Social Research and University of Chicago. (Social Sciences)

MICHAEL LEVER, Doctor en Filosofia y Letras, University of Madrid. Taught in Ciudad Universitaria, Madrid. (Languages and Literature)

SAMUEL LEVY, M.S., Minnesota. Physicist, Engineering Mechanics Section, National Bureau of Standards, Department of Commerce. Taught in George Washington. (Technology)

R. K. LINSLEY, B.S., Worcester Polytechnic. Hydrologic Engineer, U. S. Weather Bureau, Department of Commerce. (Physical Sciences)

JOSEPH P. LOFTUS, A.B., St. Mary's. Administrative Analyst, Division of Fiscal Management, Office of Budget and Finance, USDA. (Public Administration)

OLCA LONGI, Ph.D., Johns Hopkins. Head, Romance Language Department, Mt. Vernon Junior College. Taught in Dumbarton, University of Rochester, Adelphi, and Wellesley. (Languages and Literature)

BLAKE M. LORING, D.Sc., Massachusetts Institute of Technology. Metallurgist, Naval Research Laboratory, Navy Department. Taught in Massachusetts Institute of Technology. (Physical Sciences)

ROWLAND LYON, M.A., George Washington. Division of Map Intelligence, Department of State. Taught in George Washington. (Technology)

W. J. LYNOTT, JR., E.E., Rensselaer Polytechnic. Engineer, Federal Power Commission. (Technology)

WILLIS S. MACLEOD, I.M.E., Pratt Institute of Science and Technology. Acting Deputy Director, Standards Branch, Procurement Division, Treasury Department. (Technology)

JAMES G. MADDOX, M.S., Wisconsin. Economic Analyst, Office of the Chief, Bureau of Agricultural Economics, USDA. Taught in Arkansas and Wisconsin. (Social Sciences)

HARRY MAGDOFF, B.S., New York University. Special Assistant to the Secretary of Commerce, Department of Commerce. (Social Sciences)

DANIEL N. MANDELL, M.C.S., Columbus. Administrative Analyst, Bureau of the Budget. Taught in the Washington School for Secretaries. (Public Administration)

ALLEN MANVEL, A.B., Occidental; Littauer Fellow, Harvard, 1939-40. Principal Administrative Analyst, Bureau of the Budget. (Public Administration)

HERBERT G. MARSHALL, Chief, Fiscal Examining Section, Office of Budget and Finance, USDA. (Public Administration)

WILLIAM E. MARSHALL, Fiscal Inspector, Division of Accounting, Office of Budget and Finance, USDA. (Social Sciences)

CHARLES N. MASON, M.A., Montana. Assistant Chief, Budget and Organization Division, Budget and Management Branch, Production and Marketing Administration, USDA. Taught in University of Montana. (Public Administration)

J. KENDALL MCCLAREN, Head, Division of Information, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, USDA. Taught in Northeastern Teachers College. (Languages and Literature)

I. THOMAS MCKILLOP, M.A., Columbia. Industrial Engineer, Rural Electrification Administration, USDA. Formerly operated own management consulting firm. Taught in City College of the State of New York. (Public Administration)

ARTHUR B. MCLEAN, M.A., Alabama. Director of Personnel, Federal Security Agency. Taught in University of Alabama, Brenau College, North Georgia College, and George Washington University. (Public Administration)

GARDINER C. MEANS, Ph.D., Harvard. Associate Director of Research, Committee for Economic Development. Taught in Columbia and American University. (Social Sciences)

M. C. MERRILL, Ph.D., Washington University (St. Louis). Chief of Publications, Office of Information, USDA. Taught in Missouri Botanical Gardens, Idaho Technical Institute, Utah Agricultural College, and Brigham Young. (Languages and Literature)

HOWARD A. MEYERHOFF, Ph.D., Columbia. Executive Secretary, American Association for the Advancement of Science. Taught in Columbia and Smith. Special lecturer in University of Puerto Rico and Yale. (Physical Sciences)

FRANCES HOWE MILLER, M.A., Missouri. Instructor of English, University of Maryland. (Languages and Literature)

HARRY T. MILLER, B.A., Tennessee. Administrative Analyst, Bureau of the Budget. Taught in University of Tennessee. (Public Administration)

RAYMOND W. MILLER, LL.D., St. Johns. President, American Institute of Cooperation. (Social Sciences)

WILLIAM A. MINOR, B.S.A., Georgia. Assistant to the Secretary of Agriculture. (Social Sciences)

VERNA C. MOHAGEN, M.A., George Washington. Assistant Chief, Personnel Management Division, Soil Conservation Service, USDA. (Office Techniques)

LANE A. MOORE, Ph.D., Michigan State. Dairy Husbandman, Bureau of Dairy Industry, Agricultural Research Administration, USDA. Taught in Michigan State and Maryland. Winner, Borden Award, American Dairy Science Association. (Biological Sciences)

ELMER MOSTOW, LL.M., George Washington. Attorney, Office of the Solicitor, USDA. (Public Administration)

EUGENE C. MOYER, C.P.A., B.S., Georgetown. Chief Accountant, Contract Division, Bureau of Ships, Navy Department. Taught in Georgetown University. (Public Administration)

MARK L. NICHOLS, D.Sc., Clemson. Chief of Research, Soil Conservation Service, USDA. Taught in Alabama Polytechnic Institute. (Social Sciences)

HAROLD NISSELSON, B.S., College of City of New York. Lt. (jg) USNR, Medical Statistics Division, Bureau of Medicine and Surgery, Navy Department. Taught in American University. (Mathematics and Statistics)

WILLIAM R. OSGOOD, Ph.D., Illinois. Mechanical Engineer, Structural Mechanics Division, David Taylor Model Basin, Navy Department. Taught in Illinois and Cornell. (Technology)

ARTHUR C. PARSONS, M.A., Maryland. Assistant Professor of Foreign Languages, University of Maryland. (Languages and Literature)

GEORGE W. PATTERSON, M.A., Columbia. Physicist, National Hydraulic Laboratory, National Bureau of Standards, Department of Commerce. (Technology)

JAMES F. PERRIN, LL.B., National. Executive Assistant to the Director, Office of Defense Transportation. (Social Sciences)

FRANK A. PETRIE, A.B., Dakota Wesleyan. Chief of Research and Analysis Section, Training Division, Veterans Administration. Taught in the University of Florida. (Public Administration)

JOHN D. PHENIX, M.A., Texas. Principal Actuary, Retirement Division, U. S. Civil Service Commission. (Social Sciences)

JOSEPH PONTI, M.A., Stanford; graduate study, Freiburg, Besancon, and Bologna. Foreign Broadcast Monitor, Foreign Broadcast Intelligence Service, War Department. (Languages and Literature)

O. A. POPE, Ph.D., Iowa State. Bio-metrician, Complementary Crops Division, Technical Collaboration Branch, Office of Foreign Agricultural Relations, USDA. Taught in Arkansas and Delaware. (Mathematics and Statistics)

STEFAN T. POSSONY, Ph.D., Vienna. Air Intelligence Specialist, Headquarters, Army Air Forces, War Department. Fellow in the Institute for Advanced Study at Princeton. Author. (Social Sciences)

RICHARD POWERS. Architect. Design Division, Public Buildings Administration, Federal Works Agency. (Technology)

HESTER B. PROVENSEN, LL.B., George Washington. Assistant Professor of Speech, University of Maryland. (Languages and Literature)

JOHN PROVINSE, Ph.D., Chicago. Assistant Commissioner, Office of Indian Affairs, Department of Interior. Taught in Arizona. (Social Sciences)

ELBRIDGE C. PURDY, Assistant Chief, Photographic Section, Office of Plant and Operations, USDA. Twenty-five years' general photographic experience. (Technology)

C. M. PURVES, M.A., Minnesota. In Charge, Statistical Coordination and Analysis Work, Office of Foreign Agricultural Relations, USDA. Taught in Texas A. & M. (Mathematics and Statistics and Social Sciences)

ARTHUR F. RAPER, Ph.D., North Carolina. Senior Social Science Analyst, Division of Farm Population and Rural Welfare, Bureau of Agricultural Economics, USDA. Taught in Agnes Scott College. (Social Sciences)

HOWARD S. RAPPLEYE, Senior Mathematician, Chief, Section of Leveling, U. S. Coast and Geodetic Survey, Department of Commerce. Taught in Columbia, Howard University and University of Maryland. (Technology)

T. ROY REID, M.S., Wisconsin. Director of Personnel, USDA. Taught in Clinton College and Arkansas A. & M. (Social Sciences)

MARION W. RICHARDSON, Ph.D., Chicago. Expert Consultant to the Secretary of War, War Department. (Public Administration)

CLARA RICHTER, B.S., Missouri Central State Teachers College. Placement Officer, War Assets Administration. Taught in Justus Business School. (Office Techniques)

MARY-CARTER ROBERTS, A.B., Marietta. Book Editor, Washington *Evening Star*. Extensive experience in writing and lecturing as a book critic; formerly on staff of New York *Sun* and *Herald-Tribune*. (Languages and Literature)

RALPH S. ROBERTS, LL.M., George Washington. Assistant Director of Finance, Office of Budget and Finance, USDA. (Public Administration)

MYLES E. ROBINSON, Ph.D., Northwestern. Economist, Air Transport Association of America. Taught in Thiel College, American, Millikin and Northwestern. (Social Sciences)

KENNETH W. ROSS, C.E., Thayer School of Engineering. Senior Engineer, Federal Power Commission. Hydroelectric Planning and Design, T.V.A. (Technology)

JOHN ROSSETTI, M.A., New York University; Certificat D'Etudes, University of Paris. Senior Foreign Broadcast Monitor, Foreign Broadcast Intelligence Service, War Department. Taught in New York University and Sweet Briar College. (Languages and Literature)

EDWARD B. ROWAN, M.A., Harvard. Fine Arts Consultant, Public Buildings Administration, Federal Works Agency. Taught in the Biarritz Army University. (Technology)

WILLIAM H. ROWE, M.S., Kansas State. Chief, Program Planning Section, Underwriting Division, Federal Crop Insurance Corporation, Production and Marketing Administration, USDA. Taught in Kansas State College and University of Akron. (Public Administration and Social Sciences)

E. J. ROWELL, B.S., Massachusetts State College. Assistant Director, Office of Information Service, Production and Marketing Service, USDA. (Languages and Literature)

JOHN C. RUSSELL, Ph.D., Stanford. Administrative Analyst, Bureau of the Budget. Taught in Stanford and Syracuse. (Public Administration)

GEORGE M. SAHAROV, A.B., California at Los Angeles; graduate of Classical Gymnasium, Tula, Russia. Statistician, Department of Labor. Taught in University of Southern California and private instruction according to Russian Gymnasium program, Shanghai, China. (Languages and Literature)

VERNE L. SAMSON, A.B., Washington State. Training and Employee Relations Adviser, Personnel Division, Federal Public Housing Authority. Taught in Whitworth and Washington State College. (Office Techniques)

LENORE E. SATER, M.S., Iowa State College. Head, Housing and Household Equipment Division, Bureau of Human Nutrition and Home Economics, Agricultural Research Administration, USDA. Taught in Iowa State College. (Technology)

JAMES SCAMMAHORN, Chief, Purchase, Sales and Traffic Division, Office of Budget and Finance, USDA. (Office Techniques and Public Administration)

EMIL SCHELL, M.A., Western Reserve. Statistician, Bureau of Labor Statistics, Department of Labor. (Mathematics and Statistics)

HERBERT F. SCHIEFER, Ph.D., Michigan. Senior Physicist, National Bureau of Standards, Department of Commerce. Taught in Michigan and Des Moines University. (Technology)

EDGAR A. SCHULER, Ph.D., Harvard. Senior Social Scientist, Division of Farm Population and Rural Welfare, Bureau of Agricultural Economics, USDA. Taught in Louisiana State. (Social Sciences)

ERIC T. SCHULER, B.S.L., Columbia. Research Cataloguer, Slavic Section, Library of Congress. Taught in Cornell. (Languages and Literature)

F. J. SETTE, M.S., Harvard. Special Assistant to the Director, Bureau of Reconversion Priorities, Civilian Production Administration. Taught in Virginia Polytechnic Institute, Norwich University and University of Puerto Rico. (Social Sciences and Technology)

ALEXANDER L. SHANDS, B.S., College of City of New York. Meteorologist, Hydro-meteorological Section, Weather Bureau, Department of Commerce. (Physical Sciences)

RALPH R. SHAW, M.S., Columbia. Librarian, USDA. Taught in Columbia. (Social Sciences)

ROBERT H. SHIELDS, LL.B., Harvard. Administrator, Production and Marketing Administration, USDA. (Social Sciences)

C. A. SHREEVE, JR., M.S., Maryland. Associate Professor of Mechanical Engineering, University of Maryland. Taught in Pratt Institute. (Technology)

WILLARD R. SIMMONS, M.A., Duke. Head of Special Service Section, Research and Statistics Service, U. S. Office of Education, Federal Security Agency. (Mathematics and Statistics)

C. T. SMITH, Records Management and Procedure Analyst, Office of Plant and Operations, USDA. (Office Techniques)

CHARLES W. SMITH, JR., Ph.D., Wisconsin. Public Opinion Analyst, Department of State. Taught in Indiana University, Rutgers, University of Alabama, and University of Kentucky. (Public Administration)

WILEY C. SMITH, M.S., George Washington. Chief, Chemicals Section, Specifications Division, Standards Branch, Procurement Division, Treasury Department. (Technology)

DALLAS W. SMYTHE, Ph.D., California. Chief, Economics Division, Federal Communications Commission. Taught in California. (Social Sciences)

HAMPTON K. SNELL, Ph.D., Yale. Assistant to Vice-President, Department of Research, Association of American Railroads. Taught in Montana and Southern California. (Social Sciences)

H. M. SOUTHWORTH, A.B., Cornell. Principal Agricultural Economist, Fruit and Vegetable Branch, Production and Marketing Administration, USDA. (Social Sciences)

HERMANN MARIA SPITZER, B.A., Oxford, Dr. Juris, Vienna. Was with the International Labour Office; attended First World Economic Conference; was Secretary General of the International Association of Department Stores. Taught in the Army Special Training Program at Hamilton College. (Social Sciences)

O. GLENN STAHL, Ph.D., New York. Assistant Director of Personnel, Federal Security Agency. Taught in New York University and University of Tennessee. (Public Administration)

J. GORDON STEELE, Ph.D., Ohio State. Senior Soil Scientist, Soil Conservation Surveys Division, Soil Conservation Service, USDA. (Physical Sciences)

JOSEPH STEINBERG, B.S., College of City of New York. Statistician, Bureau of the Census, Department of Commerce. Resident Collaborator, Statistical Laboratories, Iowa State. (Mathematics and Statistics)

MILDRED R. STEPHENS, B.S., Alabama College. Training Officer, Bureau of Ships, Navy Department. (Office Techniques)

FREDERICK J. STEVENSON, Ph.D., Washington State. Principal Geneticist, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, USDA. Taught in Minnesota. (Biological Sciences)

H. L. STEWART, M.S., Harvard. In Charge of Western Section, Division of Farm Management, Bureau of Agricultural Economics, USDA. (Social Sciences)

HAROLD A. STONE, M.S., Syracuse. Chief, Division of Fiscal Management, Office of Budget and Finance, USDA. Taught in Tulane. (Public Administration)

ALEXANDER STURGES, B.S., Oregon State. Chief, Employment Statistics Division, Bureau of Labor Statistics, Department of Labor. (Mathematics and Statistics)

BALLINA G. MEDRANO DE SUPERVIA, Cursos Licenciatura en Filosofia y Letras, Universidad de Valencia. Spanish Teacher in The Sidwell Friends School. Taught in the schools of Valencia, Spain, and the Dominican Republic. (Languages and Literature)

RAFAEL SUPERVIA, Licenciado en Derecho, Universidad de Valencia, Spain. Taught Spanish grammar and literature in Instituto-Escuela, Ciudad Fruijillo, Dominican Republic. (Languages and Literature)

JOHN G. SUTTON, C.E., California. Head, Drainage Section, Engineering Division, Soil Conservation Service, USDA. (Technology)

CONRAD TAEUBER, Ph.D., Minnesota. Special Assistant to the Chief, Bureau of Agricultural Economics, USDA. Taught in Minnesota, Wisconsin, and Mt. Holyoke. (Social Sciences)

IRENE B. TAEUBER, Ph.D., Minnesota. Research Associate, Office of Population Research, Princeton University. Taught in Minnesota, Missouri, and Stephens College. (Social Sciences)

EUGENIA TARAKUS, education in Russian gymnasium and University of Liege. On staff of Library of Congress. (Languages and Literature)

CARL C. TAYLOR, Ph.D., Missouri. Chief, Division of Farm Population and Rural Welfare, Bureau of Agricultural Economics, USDA. Taught in Texas, Missouri, North Carolina State, Brookings Institution, and Catholic University. (Social Sciences)

BENJAMIN J. TEPPING, Ph.D., Ohio State. Statistician, Bureau of the Census, Department of Commerce. Taught in Ohio State. (Mathematics and Statistics)

VALERY J. TERESHTENKO, Engineer of Economics, State Commercial Institute, Prague. Acting Chief, Eastern European Branch, UNRRA. Taught in Co-operative Institute, Prague. (Social Sciences)

G. C. TEWINKEL, M.C.E., Syracuse. Photogrammetrist, Head of Stereoscopic Mapping Section, Division of Photogrammetry, U. S. Coast and Geodetic Survey, Department of Commerce. Taught in George Washington and Maryland. (Technology)

FREDERICK L. THOMSEN, Ph.D., Wisconsin. Chief, Division of Marketing and Transportation Research, Bureau of Agricultural Economics, USDA. Taught in Kansas State and Missouri. (Social Sciences)

FRANK THONE, Ph.D., Chicago. Staff Member, Science Service. Taught at North Dakota Agricultural College and Florida. (Languages and Literature)

PHILIP T. THORSON, M.A., American. Acting Budget and Planning Officer, Foreign Funds Control, Treasury Department. Taught in New York University. (Office Techniques)

JOHN L. TIERNEY, Ph.B., Loyola University, New Orleans. Fiscal Inspector, Division of Accounting, Office of Budget and Finance, USDA. Taught in St. Aloysius College, Vicksburg. (Office Techniques)

CARL W. TILLER, M.A., Minnesota. Principal Administrative Analyst, Bureau of the Budget. (Public Administration)

JOHN F. TIMMONS, Ph.D., Wisconsin. Agricultural Economist, Division of Land Economics, Bureau of Agricultural Economics, USDA. Taught in Wisconsin. (Social Sciences)

LEWIS R. TOLL, M.S., Illinois. Business Analyst, Central Price Office, Office of Price Administration. Taught in Washington State, Western Illinois State Teachers College and New York University. (Office Techniques)

RAWLEIGH L. TREMAIN, LL.B., George Washington. Attorney, Office of the Solicitor, USDA. (Public Administration)

I-MIEN TSIANG, Ph.D., Johns Hopkins. Administrative Analyst, Displaced Persons Division, UNRRA. Taught languages in China. (Languages and Literature)

ARTHUR W. TURNER, B.S., Iowa State College. Assistant Chief, Bureau of Plant Industry, Soils and Agricultural Engineering, Agricultural Research Administration, USDA. Taught in Iowa State College. (Technology)

MORRIS B. ULLMAN, M.A., American. Statistician, Office of the Statistical Assistant to the Director, Bureau of the Census, Department of Commerce (Mathematics and Statistics)

WILLIAM VAN ROYEN, Ph.D., Clark. Professor of Economic Geography, University of Maryland and Collaborator, Bureau of Agricultural Economics, USDA. (Social Sciences)

HAROLD B. VASEY, B.S., Iowa. Administrative Analyst, Bureau of the Budget. Taught in the University of Iowa. (Public Administration)

NATHALIE VON BRETZEL, Diploma, Foreign Language Institute, St. Petersburg. Cataloger, Library of Congress. (Languages and Literature)

H. J. WADLEIGH, M.A., Oxford. Special Assistant to the Director, Food Division, UNRRA. Taught in George Washington. (Social Sciences)

NORMAN J. WALL, M.A., Minnesota. Head, Division of Agricultural Finance, Bureau of Agricultural Economics, USDA. (Social Sciences)

KATHRYN PAINTER WARD, M.A., George Washington. Assistant Professor of English, University of Maryland. (Languages and Literature)

RAY WARD, A.B., Washington. Administrative Analyst, Bureau of the Budget. (Public Administration)

MAX J. WASSERMAN, Docteur es Sciences Economiques, University of Lyons, France. Head Economist, Financial Policy Branch, Office of International Trade, Department of Commerce. Taught in Illinois, Chicago and Lyons (France). Fellow, Social Science Research Council, in France, 1927-29. (Social Sciences)

FREDERICK V. WAUGH, Ph.D., Columbia. Chief Agricultural Economist, Production and Marketing Administration, USDA, on leave as Consultant to Office of War Mobilization and Reconversion. Taught in Cornell and Brookings Institution. (Social Sciences)

ROBERT L. WEBSTER, M.S., Columbia. Assistant Director of Information, Office of Information, USDA. (Public Administration)

OSCAR WEIGERT, Jur.D., Marburg. Labor Economist, Department of Labor. Taught in American. (Social Sciences)

SAMUEL WEISS, M.A., Michigan. Associate Chief, Bureau of Labor Statistics, Department of Labor. (Mathematics and Statistics)

ORIS V. WELLS, B.S., New Mexico State. Chief, Bureau of Agricultural Economics, USDA. (Social Sciences)

JOHN H. WETZEL, C.E., Rensselaer Polytechnic. Head, Safety and Health Section, Personnel Management Division, Soil Conservation Service, USDA. (Public Administration)

LESLIE WHEELER, M.B.A., Harvard. Director, Office of Foreign Agricultural Relations, USDA. (Social Sciences)

CLAYTON E. WHIPPLE, M.S., Cornell. Head Agricultural Economist, Office of Foreign Agricultural Relations, USDA. Formerly lecturer in Universities of Sofia and Zagreb. Taught in State Teachers College, Oneonta, New York. Formerly Director of Rural Education, Near East Foundation in Balkans and Near East, and Adviser in Agriculture and Education to the Royal Bulgarian Government. (Social Sciences)

RICHARD E. WHITAKER, B.S.F., Montana. Assistant Topographic Engineer, Forest Service, USDA. (Technology)

BENNETT S. WHITE, JR., Ph.D., Harvard. Assistant Chief, Division of Statistical and Historical Research, Bureau of Agricultural Economics, USDA. Taught in Kentucky and George Washington. (Social Sciences)

CHARLOTTE L. WHITE, M.A., Radcliffe. Specialist in Diction, Editorial Section of Division of Publications, Office of Information, USDA. (Office Techniques)

LEO G. D. WIEMER, Architect, Office of Supervising Architect, Public Buildings Administration, Federal Works Agency. (Technology)

FAITH M. WILLIAMS, Ph.D., Columbia. Director, Staff on Foreign Labor Conditions, Bureau of Labor Statistics, Department of Labor. Taught in Wells College, American and Cornell. (Social Sciences)

HELEN W. WILLIAMS, M.A., Columbia. Editor, Library, USDA. (Languages and Literature)

M. C. WILSON, B.S., Cornell. Deputy Director of Extension, In Charge Farm Labor Program, USDA. Taught summer session courses at Universities of Wisconsin, Louisiana, Maryland, Purdue, Arkansas, State Agricultural College of Colorado, Virginia Polytechnic Institute. (Languages and Literature)

CLEMENT WINSTON, Ph.D., Pennsylvania. Economist, Office of Business Economics, Department of Commerce. Taught in Pennsylvania. (Mathematics and Statistics)

T. J. WOOFTER, Ph.D., Columbia. Director of Research, Federal Security Agency. Taught in University of North Carolina. (Social Sciences)

CHARLES L. WRIGHT, JR., B.S., Massachusetts Institute of Technology. Senior Engineer (Naval Architect), Bureau of Ships, Navy Department. (Technology)

ALEXANDER W. WUNDHEILER, Ph.D., University of Warsaw. Physicist, Bureau of Ordnance, Navy Department. Taught in University of Warsaw, Massachusetts Institute of Technology, City College of New York, and the University of Rochester. (Mathematics and Statistics)

DAVID NORTON YERKES, B.F.A., Yale Architectural School. Architect. Taught in Fort Belvoir Engineer School. (Technology)

EARL P. YOCUM, M.A., George Washington. Assistant Administrative Officer, Bureau of Naval Personnel, Navy Department. (Office Techniques)

JOSEPH G. YOSHIOKA, Ph.D., California. Director, Oriental Science Literature Service, American Documentation Institute. Taught in Yale and Tokio Imperial University. (Languages and Literature)

OSCAR ZAGLITS, D. Rerum Politicarum, University of Vienna. Principal Agricultural Economist, in charge of Finance and Operation Section, Division of International Economics Studies, Office of Foreign Agricultural Relations, USDA. (Social Sciences)

## Index

Accounting and Auditing, 44, 63, 77  
Accreditment, 10  
Administration Board, 3  
Administration, Courses, 66  
Administration, Officers of, 3  
Aerial Photogrammetry, 115  
Agricultural Economics, 84, 93  
Agricultural Education, 95  
Agricultural Engineering, 109  
Agricultural Finance, 95  
Agricultural Marketing, 95  
Agricultural Policy, 91  
Air Conditioning, 109  
Air Transportation, 105  
American Business, 86  
Animal Breeding, 18  
Arabic, 26  
Architecture, 108, 117  
Art, 116

Biological Sciences, Department of, 17  
Botany, 19  
Budgetary Administration, 71  
Bureau of Standards, 57  
Business, 78, 86

Calendar (inside front cover)  
Cartography, 116  
Certification, 11  
Certified Statements of Accomplishment, 11, 30, 60, 84  
Chemistry, 52, 119  
Chinese, 26  
Civil Service Commission, 10, 51  
Clerical-Administrative Procedures, 42  
Communications, 98, 103  
Consumption Economics, 88  
Contracts, Governmental, 76, 112  
Cooperation, 95  
Correspondence Study, 9  
Counseling, 8, 73, 100  
Crop Insurance, 93

Degree Requirements, 10  
Drafting, 118

Drainage and Irrigation, 108  
Drawing, 116

Economics, 85  
Editing, 22  
Engineering, 108  
Engineering Administration, 112  
Engineering Materials, 113  
English, 21  
Entomology, 19  
Extension Work, 94

Faculty, 7, 124  
Farm Management, 93  
Fellows and Interns, 12  
Financial Administration, 71  
French, 26  
Fungicides, 18

Geochemistry, 52  
Geography, 54  
Geology, 54  
German, 26  
Glass Blowing, 118  
Government-Public Relationships, 68  
Graduate School  
    Administration, 6  
    Authority, 6  
    History, Objectives, 5  
    Role in Department, 6

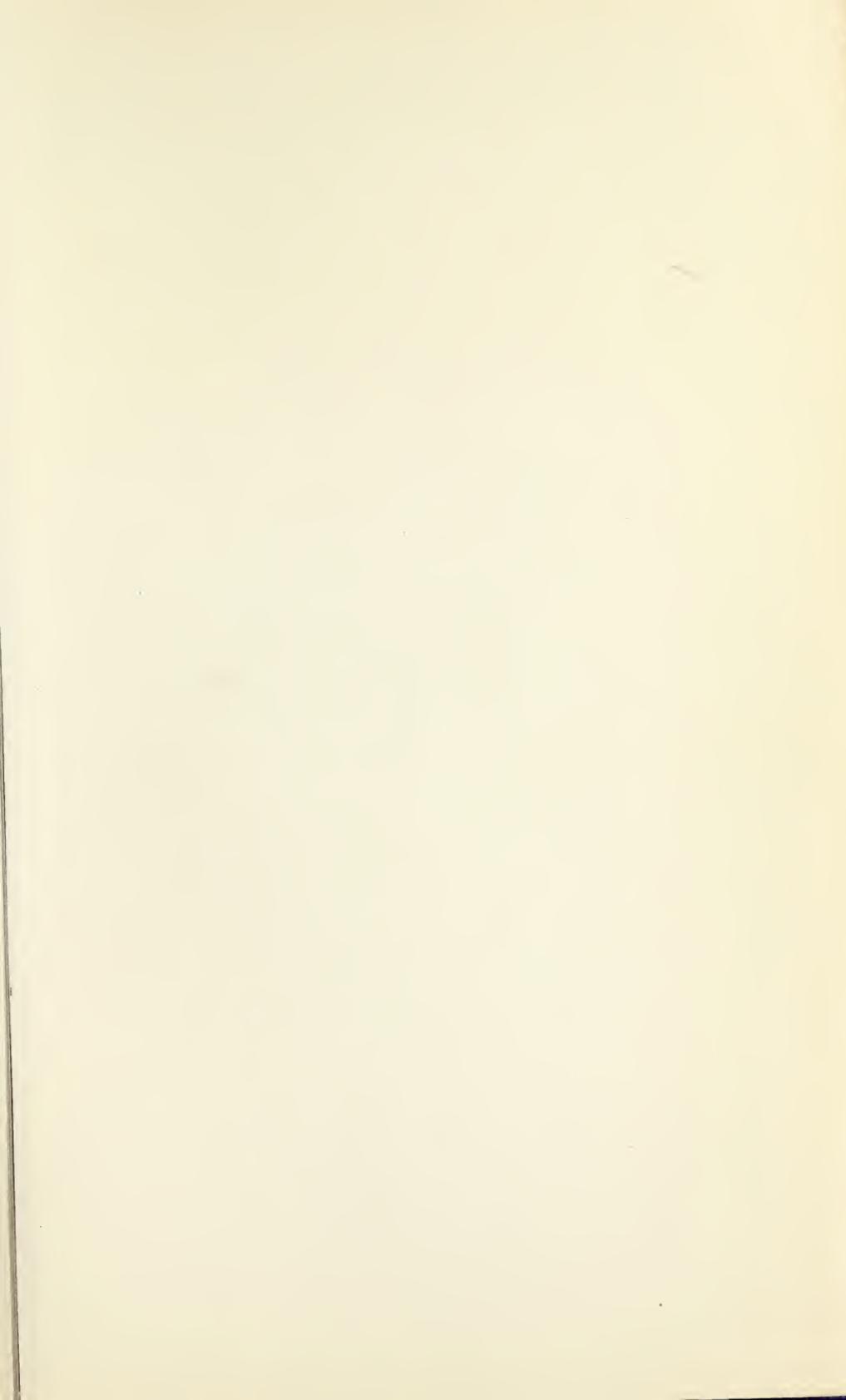
History, 91, 99, 122  
Home Decoration, 117  
Human Relations, 99  
Hydraulics, 111  
Hydrology, 56

Information, General, 5  
Insecticides, 18  
Insurance, 94  
International Relations, 96  
Internships in Statistics, 33  
Italian, 27

Japanese, 27  
Jet Propulsion, 110  
Labor Economics, 89, 101  
Labor Legislation, 89  
Languages and Literature, Department of, 21  
Languages, Foreign, 25  
Lectures, 9, 33, 65  
Legal Administration, 75  
Letters and Reports, 47  
Library Facilities, 8  
Literature, 25  
Management, 48  
Mapping, 116  
Marketing, 89  
Mathematics and Statistics, Department of, 29  
Mathematics, 35  
Mechanical Arts, 116  
Metallurgy, 55  
Meteorology, 56  
Naval Research Laboratory, 56  
Nutrition, Animal and Human, 19  
Office Techniques and Operations, Department of, 42  
Organization and Procedure Analysis, 69  
Patent Law, 114  
Personnel Administration, 45, 72  
Photography, 119  
Physics, 57  
Physical Sciences, Department of, 51  
Plant Breeding, 18  
Political Science, 66, 96  
Population, 102  
Portuguese, 27  
Printing, 23  
Procurement, 46  
Property Management, 76  
Psychology, 96, 99  
Public Finance and Taxation, 85  
Publications, 9, back cover  
Public Administration, Department of, 59  
Public Administration, General, 61, 66  
Public Administration Lecture Series, 65  
Public Regulation, 86  
Radio, 24, 39  
Regulations and Procedures  
    Admission, 12  
    Attendance, 15  
    Classification of Courses, 14  
    Credit and Grades, 15  
    Fees, 13  
    Prerequisites, 14  
    Refunds, 14  
    Registration, 13  
    Withdrawal, 14  
Research Methods, 102  
Resource Utilization, Seminar in, 92  
Room Schedule, 15  
Rural Electrification, 109  
Rural Sociology, 92  
Russian, 27  
Safety, 74  
Sampling, 32  
Scientific Personnel, 51  
Secretarial Practices, 48  
Shorthand, 48  
Social Sciences, Department of, 80  
Sociology, 101  
Soil Science, 54, 111  
Spanish, 28, 50, 102  
Speech, 23  
Statistics, 31, 37  
Surveying, 115  
Survey Techniques, 40, 91, 102  
Tax Accounting, 78  
Technology, Department of, 106  
Tests and Measurement, 72  
Textiles, 88, 120  
Transportation and Traffic, 104  
Utility, Administration and Regulation, 122  
Veterans, 12, 73  
Writing, Letters and Reports, 23, 47  
Work Measurement, 69  
World Organization, 96







## PUBLICATIONS OF THE GRADUATE SCHOOL PUBLIC ADMINISTRATION

**LECTURES ON ADMINISTRATIVE REGULATION.** Lectures delivered by Lloyd K. Garrison, Thomas Blaisdell, Paul H. Appleby, Fowler Harper, Clarence Kitchen, and Jacob Rosenthal. Paper bound (1945), 80 pp. 50c.

**WASHINGTON-FIELD RELATIONSHIPS IN THE FEDERAL SERVICE.** Lectures and papers by Donald C. Stone, Earl W. Loveridge and Peter Keplinger, William L. Mitchell, and James W. Fesler. Paper bound (1942), 60 pp. 35c.

**AS I SEE IT: *Observations of a Civil Servant*** by Warner W. Stockberger. Fifty short essays on public administration, especially personnel administration, written by the "dean of personnel administrators" in the Federal service. Paper bound (1941), 50 pp. 35c a single copy; 25c in lots of 10 or more.

**ADMINISTRATION.** Four lectures by Louis Brownlow, Arthur W. MacMahon, John Dickinson, John M. Gaus. Mimeographed (1939). 46 pp. 50c.

**ADMINISTRATIVE MANAGEMENT.** Lectures, with discussion summaries, by ten outstanding leaders in the management field, including Tead, Person, Uhrbrock, Babcock, Hicks, and Donham. Cloth bound (1938), 108 pp. \$1.00; paper bound 75c.

**ELEMENTS OF PERSONNEL ADMINISTRATION.** Lectures, with accompanying problems and discussions, by eight outstanding leaders in this field, including White, Tead, Feldman, Person, and Stockberger. Paper bound (1935), 102 pp. 50c.

## STATISTICS

**GAMMA AND BETA FUNCTIONS.** Notes and problems designed for use in mathematical statistics and mathematical physics, by W. Edwards Deming. Paper bound (1944), 37 pp. \$1.00.

**FACSIMILES OF TWO PAPERS BY BAYES** (his famous essay on probability, and a note on divergent series), with commentaries by E. C. Molina and W. Edwards Deming. Cloth bound (1940), 70 pp. \$1.00.

**STATISTICAL METHOD FROM THE VIEWPOINT OF QUALITY CONTROL** by Walter A. Shewhart, edited by W. Edwards Deming. Cloth bound (1939), 155 pp. \$2.50.

**ON THE STATISTICAL THEORY OF ERRORS** by W. Edwards Deming and Raymond T. Birge. Paper bound (1938), 50 pp. 40c.

## GENERAL

**ORGANIZING FOR PEACE.** Addresses by Nathaniel Peffer, Pitman Potter, Jacob Viner, Hanson Baldwin, Derwent Whittlesey, Senator James W. Fulbright, and André Géraud (Pertinax). Paper bound (1945), 79 pp. 75c.

**PRIMARY ELEMENTS OF THE AMERICAN TRADITION.** An address by Edmund E. Day, President of Cornell University. Paper bound (1942), 12 pp. 10c.

**THE PHILOSOPHY OF HISTORY AND ITS BEARING ON THE WAR.** An address by Carl F. Taesch. Paper bound (1942), 15 pp. 10c.

**DESIGN FOR DEFENSE.** A symposium: *Public Opinion* by Max Lerner; *Technology* by Walter Rautenstrauch; *Diplomacy* by Adolf A. Berle, Jr.; *Agriculture* by John D. Black. Published in cooperation with the American Council on Public Affairs. Paper bound (1941), 40 pp. 35c.

**OUTLINE OF NAVAL ARCHITECTURE AND SHIP CONSTRUCTION.** By Charles L. Wright, Jr. Second ed., rev. Paper bound (1942). 2 volumes. \$2.00 per volume.

*Make checks and money orders payable to*

GRADUATE SCHOOL  
DEPARTMENT OF AGRICULTURE